BIOLOGICAL ASSESSMENT

FOR THE PANOCHE VALLEY SOLAR FACILITY

April 2014

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DEFINITIONS

Biological Monitor	Observers that work on-site to perform biological surveys or provide oversight of ground disturbing activities as needed and that receive instruction from and report to the Designated Biologist(s).
Conservation Lands	Three large parcels of land to offset potential impacts as part of a conservation package consisting of the permanent preservation and management of those parcels (Valley Floor Conservation Lands, Valadeao Ranch Conservation Lands, and Silver Creek Ranch Conservation Lands).
The County	San Benito County
Designated Biologist	Biologist knowledgeable and experienced in the biology and natural history of the T&E Species on the Project, whom shall be responsible for monitoring construction activities to help minimize and fully mitigate or avoid the incidental take of individual species and to minimize disturbance of T&E Species' habitat. This biologist may appoint biological monitors to perform biological surveys or provide oversight of ground disturbing activities as needed in their place.
Ldn	The average equivalent sound level over a 24 hour period, with a penalty for noise during the nighttime hours.
The Action	The development of the Panoche Valley Solar Project, including the Project Footprint and associated conservation lands in the Panoche Valley of eastern San Benito County, California.
Project Footprint	The portion of the Action that includes the solar arrays and associated roads and equipment, totaling 2,492 acres.
Project Roads	Project roads include roads designated for construction, project perimeter roads, and transportation corridors between panels.
PVS	Panoche Valley Solar; name of the project.
T&E species	Federally listed threatened or endangered species.

ACRONYMS

AC	alternating current
ACECs	areas of Critical Environmental Concern
AMBA	American badger
amsl	above mean sea level
APLIC	Avian Power Line Interaction Committee
BA	Biological Assessment
BLM	Bureau of Land Management
BMPs	best management practices
BNLL	Blunt-nosed Leopard Lizard
BUOW	Burrowing owl
CACO	California condor
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFS	Conservancy Fairy Shrimp
CL	Conservation Lands
cm	centimeters
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CTS	California Tiger Salamander
CUP	Conditional Use Permit
dBA	A-weighted decibels
DC	direct current
DEIR	Draft Environmental Impact Report
DTT	direct transfer trip

EIS	Environmental Impact Statement
ESA	Endangered Species Act
F˚	Fahrenheit
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIR	Final Environmental Impact Report
ft	feet
ft^2	square feet
GIS	Geographic Information Systems
GKR	Giant Kangaroo Rat
GOEA	Golden eagle
HSM	habitat suitability model
km	kilometers
LHFS	Longhorn Fairy Shrimp
LOA	Live Oak Associates, Inc.
LSAA	Lake or Streambed Alteration Agreement
m	meters
m^2	square meters
mm	millimeter
mph	miles per hour
MW	megawatt
NIU	Network Interface Unit
O&M	Operations and maintenance
OPGW	optical ground wire
PG&E	Pacific Electric and Gas
PLC	Power line carrier

POTT	permissive overreaching transfer trip
PV	photovoltaic
PVS	Panoche Valley Solar, LLC
ROW	Right-of-way
SCADA	Supervisory Control and Data Acquisition
SCPs	Scientific Collecting Permits
SCRCL	Silver Creek Ranch Conservation Lands
SJAS	San Joaquin antelope squirrel
SJKF	San Joaquin Kit Fox
T&E	threatened or endangered
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VFCL	Valley Floor Conservation Lands
VPFS	Vernal Pool Fairy Shrimp
VPTS	Vernal Pool Tadpole Shrimp
VRCL	Valadeao Ranch Conservation Lands
yd^3	cubic yard

EXECUTIVE SUMMARY

INTRODUCTION

Panoche Valley Solar, LLC proposes to construct and operate an approximately 399 megawatt solar photovoltaic energy generating facility in San Benito County, California. The project is referred to herein as the Panoche Valley Solar (PVS) Facility. The Project Footprint consists of approximately 2,492 acres in the Panoche Valley of eastern San Benito County. The Project includes construction and operation of the solar array complexes, an operations and maintenance building, project perimeter roads including emergency access and egress, electricity collection lines, DC-AC inverters, an electrical substation and switchyard, and Pacific Gas & Electric telecommunication upgrades. Construction of the PVS Facility is anticipated to commence late 2014 or early 2015 and proceed thereafter in phases over a period up to five years.

The Project incorporates important general and species specific conservation measures proposed by PVS to avoid and minimize impacts on biological resources. In addition, the Project will implement a conservation package consisting of permanent preservation, enhancement, and management of three large parcels of land adjacent to the project footprint to offset potential impacts to special status species. Together the three parcels total approximately 24,185 acres of high quality conservation land that will provide local mitigation, preserve core populations of special status species, and create permanent movement corridors with adjacent lands controlled by the U.S Department of Interior's Bureau of Land Management (BLM) for those species.

PURPOSE AND CONCLUSIONS OF THIS BIOLOGICAL ASSESSMENT

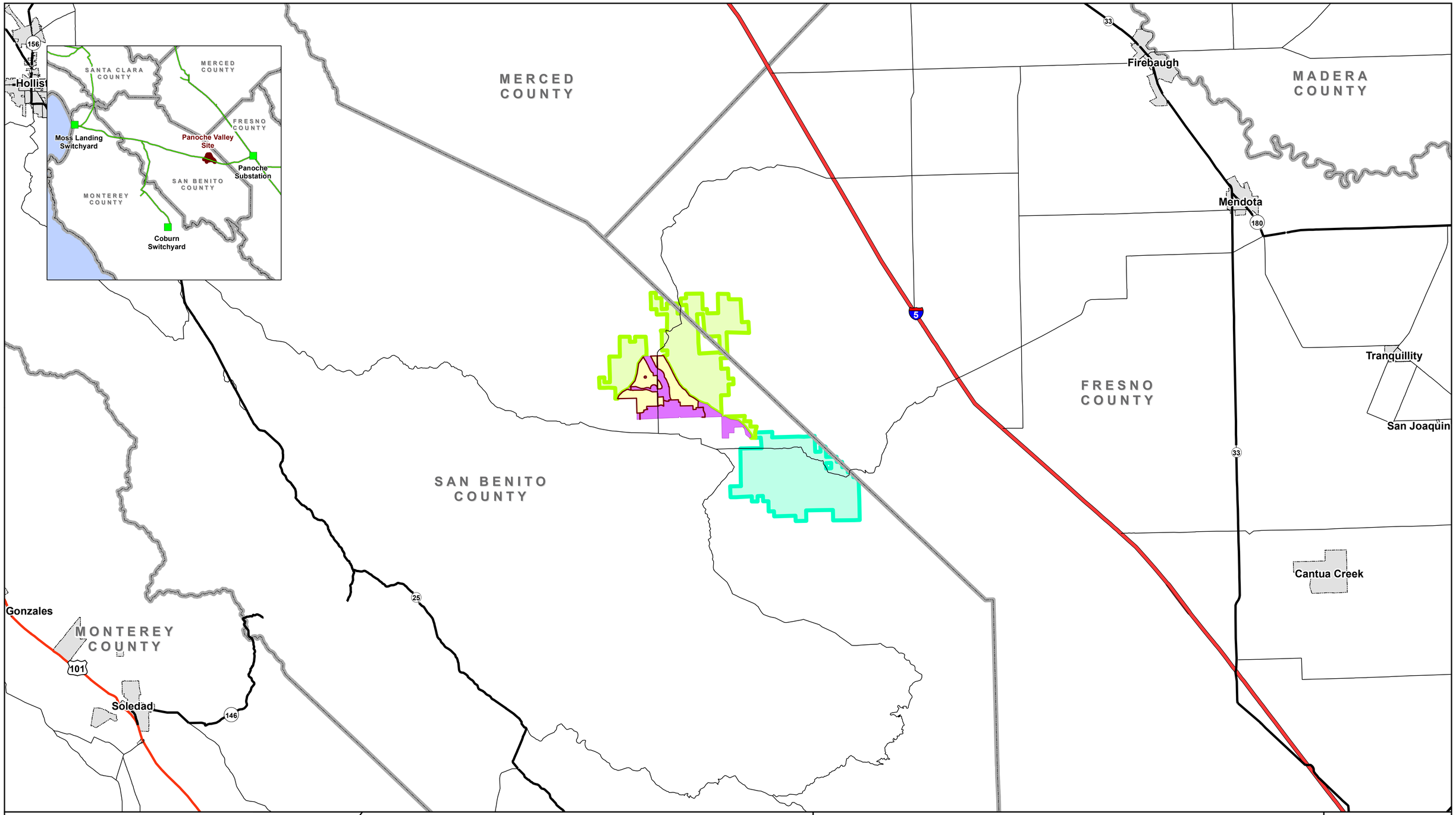
For purposes of constructing an emergency access/egress road, PVS has applied to the United States Army Corps of Engineers (USACE) for issuance of a federal permit authorizing fill of certain waters of the United States pursuant to Section 404 of the Clean Water Act (CWA). This Biological Assessment has been prepared by the applicant on behalf of USACE, to evaluate the potential impacts of the Project on federally-listed or proposed species and designated and proposed critical habitat under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq. This Biological Assessment has determined that the Project may affect federally threatened and endangered species. However, the Project does not impact any federally proposed species and is not located within any listed or proposed critical habitat of any federally listed species. Therefore, the USASCE requests formal consultation of the U.S. Fish and Wildlife Service (USFWS) under Section 7(a)(2) of the Endangered Species Act. This Biological Assessment further concludes, that taken as a whole in concert with the proposed conservation and preservation and enhancement measures to be implemented on the mitigation lands, the Project, whether considered alone or cumulatively, presents a substantial conservation benefit that would help secure the continued existence and recovery of the affected federally protected species.

1.0 INTRODUCTION

1.1 Purpose of this Document

Panoche Valley Solar, LLC (PVS) proposes to construct and operate an approximately 399 megawatt (MW) solar photovoltaic (PV) energy generating facility located in San Benito County, California (**Figure 1**). The project is called the Panoche Valley Solar Facility (PVS Facility, the Project, or the Action) (**Figure 2**). The Project Footprint consists of approximately 2,492 acres in the Panoche Valley of eastern San Benito County, California. The Project also includes the permanent preservation and management of approximately 24,185 acres of high quality Conservation Lands that are contiguous with the Project Footprint (**Figure 3**).

This Biological Assessment (BA) has been prepared on behalf of the U.S. Army Corps of Engineers (USACE) to evaluate the potential impacts of the Action on federally-listed threatened, endangered, and proposed species pursuant to the Endangered Species Act (ESA). Section 7(a)(2) of the ESA of 1973 (16 U.S.C. 1531 *et seq*.) states that "Each Federal agency shall, in consultation with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an "agency action") is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section. In fulfilling the requirements of this paragraph, each agency shall use the best scientific and commercial data available." PVS is seeking authorization from the USACE to fill certain waters of the United States, pursuant to Section 404 of the Clean Water Act. Since those actions may adversely affect federally listed species, the USACE is initiating formal consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7(a)(2).



Energy Renewal PARTNERS, LLC

BR
2/20/2014

Legend

- County Line
- City Limit
- Project Footprint
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands

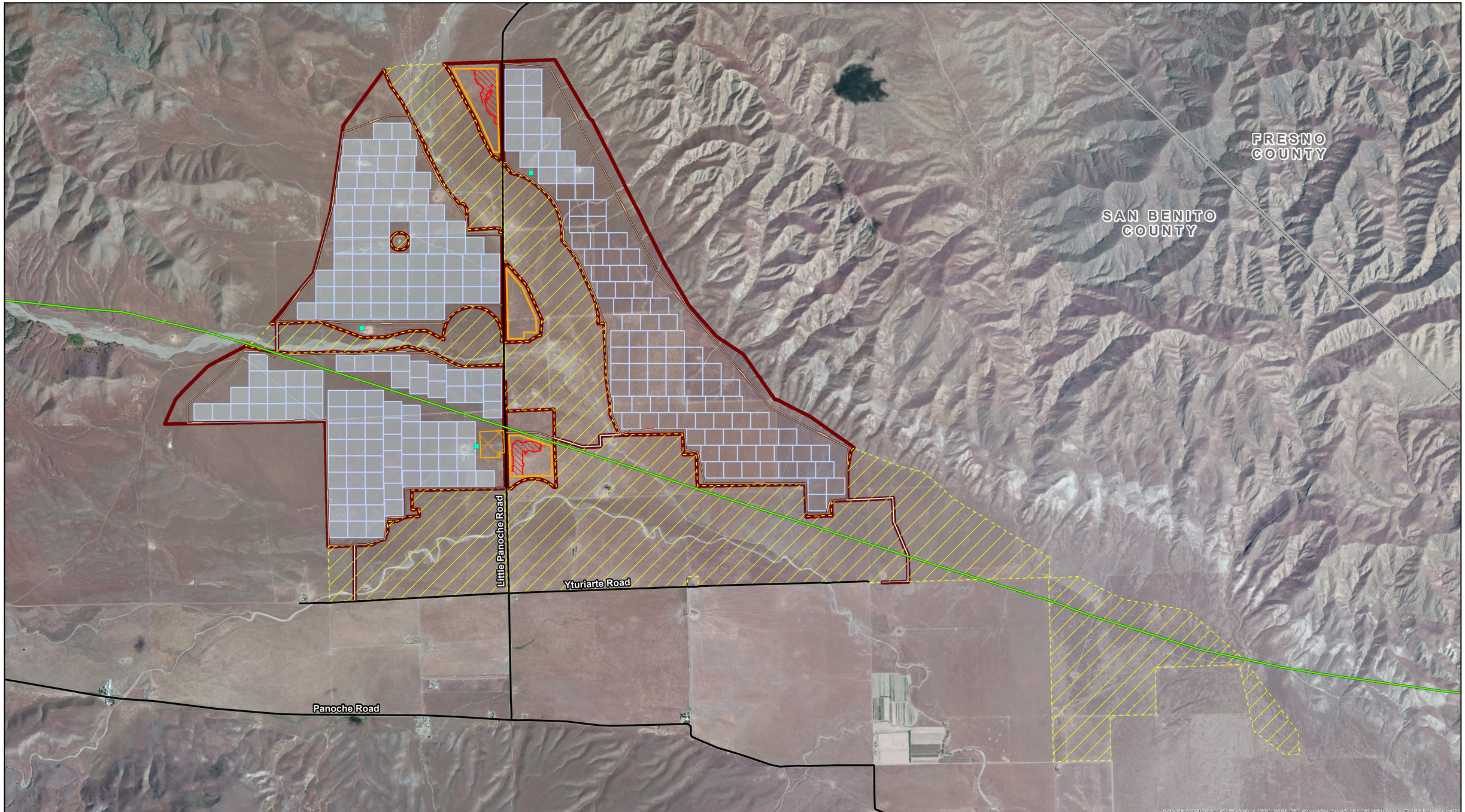
N

0 2 4
Miles

Panoche Valley Solar Project

Project Location

Figure
1



Energy Renewal PARTNERS, LLC

BR
11/26/2013

- Project Footprint
- Valley Floor Conservation Lands
- Proposed Panel Block (Phase I Shaded)
- Existing Transmission Line
- Temp. Water Supply Pond (location approx.)
- Laydown Yard Slope > 3%
- Project Substation
- Laydown Yard
- Project Road (O&M/Emergency Use)
- Project Road (Emergency Use)

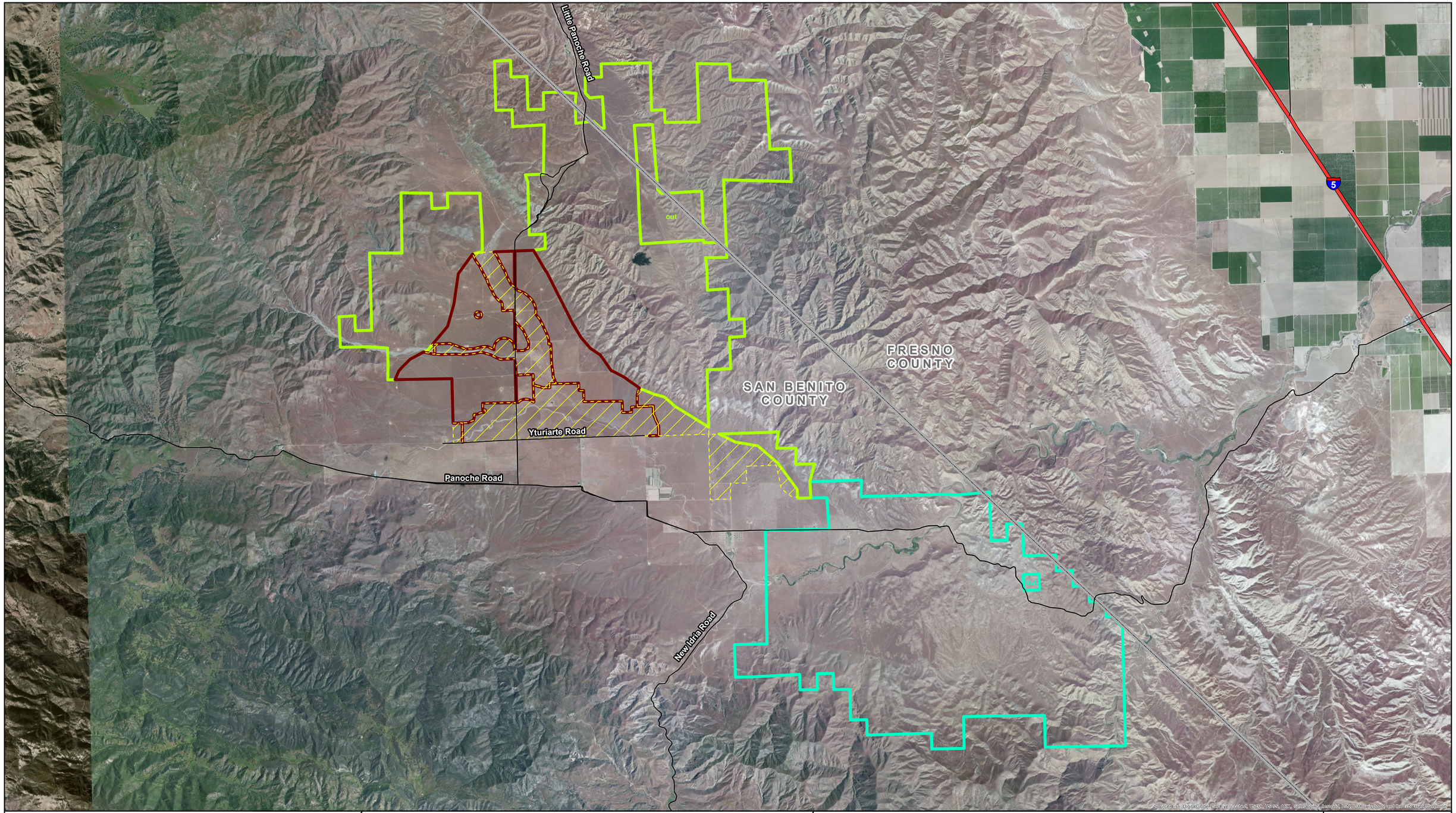
N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

Layout

Figure
2



Energy Renewal PARTNERS, LLC

BR
10/15/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands

N

0 3,500 7,000
Feet

Panoche Valley Solar Project

Project Footprint and Conservation Lands

Figure
3

1.2 Species Considered in this Document

Species considered in this BA include all federally listed proposed, threatened, and endangered species and critical habitat considered to be potentially occurring in San Benito County by the USFWS that may potentially be impacted by the Action. Of the species considered, there were eight federally endangered and three threatened species. No federally proposed species or critical habitat was found to be potentially impacted by the Action. **Table 1** describes federally listed threatened or endangered species (T&E species) with the potential to occur in San Benito County, and if those species are carried forward for further analysis in this BA.

TABLE 1 SPECIES CONSIDERED

SPECIES	FEDERAL STATUS	STATUS IN ACTION AREA	ANALYZED FURTHER[1]
San Joaquin Woolythreads (*Monolopia congdonii*)	Endangered	**Absent.** No listed designated critical habitat. No suitable habitat.	No
Vernal Pool Fairy Shrimp (VPFS; *Brachinecta lynchi*)	Threatened	**Present.** Species known to occur on the Project Footprint. No listed designated critical habitat.	Yes
Conservancy Fairy Shrimp (CFS; *B. conservatio*)	Endangered	**Absent.** Not observed despite comprehensive surveys. No listed designated critical habitat.	Yes
Longhorn Fairy Shrimp (LHFS; *B. longiantenna*)	Endangered	**Absent**. Not observed despite comprehensive surveys. No listed designated critical habitat.	Yes
Vernal Pool Tadpole Shrimp (VPTS; *Lepidurus packardi*)	Endangered	**Absent.** Not observed despite comprehensive surveys. No listed designated critical habitat.	Yes
California Red-legged Frog (*Rana draytonii*)	Threatened	**Absent.** No listed designated critical habitat. No suitable habitat.	No
California Tiger Salamander (CTS; *Ambystoma californiense*)	Threatened	**Present.** Species known to breed in ponds adjacent to the Project Footprint. No listed designated critical habitat.	Yes
Blunt-nosed Leopard Lizard (BNLL; *Gambelia silus*)	Endangered	**Present**. Species known to occur on the Project Footprint. No listed designated critical habitat.	Yes
California Condor (*Gymnogyps californianus)*	Endangered	**Present.** No suitable nesting habitat. Potential foraging habitat; species known to pass over the Project Footprint. No listed designated critical habitat.	Yes
Giant Kangaroo Rat (GKR; *Dipodomys ingens*)	Endangered	**Present**. Species known to occur on the Project Footprint. No listed designated critical habitat.	Yes

SPECIES	FEDERAL STATUS	STATUS IN ACTION AREA	ANALYZED FURTHER[1]
San Joaquin Kit Fox (SJKF; *Vulpes macrotis mutica*)	Endangered	**Present.** Species known to occur on the Project Footprint. No listed designated critical habitat.	Yes
1. Species were not carried forward for further analysis in this document if no suitable habitat occurred in the Action Area or associated conservation lands or no populations were known to occur in the case of rare plants.			

1.3 Summary of Effects Determinations

Table 2 summarizes the effects determinations for the nine species discussed in this document.

TABLE 2 SUMMARY OF EFFECTS DETERMINATIONS

Species	"May Effect, Not Likely to Adversely Affect"	"May Effect, and is Likely to Adversely Affect"
Giant Kangaroo Rat		X
San Joaquin Kit Fox		X
Blunt-nosed Leopard Lizard		X
California Tiger Salamander		X
California Condor	X	
Vernal Pool Fairy Shrimp	X	
Conservancy Fairy Shrimp	X	
Longhorn Fairy Shrimp	X	
Vernal Pool Tadpole Shrimp	X	

1.4 Consultation History

The Action evolved during San Benito County's (the County) environmental review process under the California Environmental Quality Act (CEQA). The initial Applicant (Solargen) for the Action applied to San Benito County for a Conditional Use Permit (CUP) for a 1,000 MW, 10,000-acre solar PV project on October 16, 2009. In response to concerns about the size and potential impacts of the Action, Solargen worked in collaboration with the County to reduce the Project size by almost 60 percent from 1,000 MW on 10,000 acres, to 420 MW on approximately 4,885 acres. This reduced project size was reflected on Solargen's revised final CUP application. San Benito County then prepared a Draft Environmental Impact Report (DEIR), pursuant to CEQA, which analyzed the environmental impacts of a 420 MW Project. The DEIR was made available for public comment on June 28, 2010.

Comments received from the public raised concerns regarding the 420 MW Project's potential impacts. These comments were taken into account while revising the DEIR into the Final Environmental Impact Report (FEIR). In response to these comments, the Project Footprint was again reduced in size from 420 MW and 4,885 acres to a footprint of approximately 399 MW and 2,813 acres. The approximately 399 MW Project was then reconfigured to avoid the most biologically sensitive lands and the Conservation Lands were expanded from 10,331 acres to 23,292 acres. The FEIR was published on September 30,

2010. Based on additional biological surveys completed in 2013, PVS further reduced and reconfigured the Project Footprint to 2,492 acres while increasing the Conservation Lands to 24,185 acres.

PVS participated in numerous informal consultation meetings with the USFWS and other agencies prior to submitting the original BA for the Action to the USFWS in October 2010. The USFWS responded with a number of comments and requests for additional information concerning the BA, both in meetings and discussions with PVS and in written comments submitted in February 2011. PVS then prepared and submitted an Addendum to the BA in September 2011, which the USACE transmitted to the USFWS in early October 2011. In a letter to the USACE dated March 8, 2012, the USFWS confirmed that formal Section 7 consultation began in February 2012, but noted that it was premature and infeasible to develop a specific timeline for completing the consultation, in light of the USACE's ongoing Environmental Impact Statement (EIS) process.

During meetings between the USFWS and PVS held in July 2012, the USFWS identified additional biological information required to analyze biological impacts in the forthcoming EIS and Biological Opinion. Rather than creating an additional Addendum presenting these new findings, PVS has elected to present the USFWS with this updated comprehensive BA, which consolidates information gathered over 25,000 hours of field surveys performed from the summer of 2009 through the fall of 2013.

Informal meetings to discuss the Action's potential impacts to biological resources and on-site and off-site conservation measures have been held periodically since the beginning of the planning process in 2009. The meetings were conducted with the USACE, USFWS, California Department of Fish and Wildlife (CDFW) (previously California Department of Fish and Game (CDFG)), Bureau of Land Management (BLM), Renewable Energy Action Team (REAT; consisting of personnel from California Energy Commission and CDFW), and San Benito County officials and are outlined in **Table 3**.

TABLE 3 MEETING HISTORY

DATE	ATTENDEES
April, 2009	Live Oak Associates, Inc. (LOA), Solargen, USFWS, CDFG
June 24, 2009	LOA, Solargen, USFWS, CDFG
January 6, 2010	LOA, Solargen, USFWS, CDFG
February 3, 2010	LOA, Solargen, USFWS, CDFG, USACE, San Benito County
March 3, 2010	LOA, Solargen, USFWS, CDFG, San Benito County
March 10, 2010	LOA, Solargen, USFWS, CDFG
April 7, 2010	LOA, Solargen, USFWS, CDFG
April 28, 2010	LOA, Solargen, USFWS, CDFG
May 19, 2010	LOA, Solargen, REAT, USFWS, BLM
June 2, 2010	LOA, Solargen, USFWS, CDFG, San Benito County
June 21, 2010	LOA, Solargen, USFWS, CDFG
July 7, 2010	LOA, Solargen, USFWS, CDFG
August 4, 2010	LOA, Solargen, USFWS, CDFG
August 10, 2010	LOA, Solargen, USFWS, CDFG, BLM, The Nature Conservancy
September 16, 2010	Solargen, USFWS, CDFG, California Governor's office, Department of Interior
November 3, 2010	LOA, Solargen, CDFG, USFWS
November 16, 2010	Solargen, USFWS, CDFG, California Governor's office, Department of Interior
July 26, 2012	LOA, PVS, USFWS
August 6, 2012	LOA, PVS, USFWS
November 28, 2012	LOA, PVS, McCormick Biological, Power Engineers, USFWS, CDFG, USACE
January 7, 2013	CDFW, PVS, Energy Renewal Partners, LLC
January 10, 2013	USACE, PVS, Energy Renewal Partners, LLC
April 17, 2013	USACE, PVS, Energy Renewal Partners, McCormick Biological, EMPSI
April 17, 2013	CDFW, PVS, Energy Renewal Partners, LLC, McCormick Biological
April 18, 2013	USFWS, PVS, Energy Renewal Partners, LLC
August 26, 2013	CDFW, PVS, Energy Renewal Partners, LLC
August 27, 2013	USFWS, PVS, Energy Renewal Partners, LLC
October 29, 2013	CDFW, PVS, Energy Renewal Partners, LLC, McCormick Biological
November 19, 2013	USFWS, USACE, PVS, Energy Renewal Partners, LLC, EMPSI, McCormick Biological, Brian Cypher, PhD
March 11, 2014	USACE, PVS, Energy Renewal Partners, LLC
March 12, 2014	USFWS, PVS, Energy Renewal Partners, CDFW, McCormick Biological, Brian Cypher, PhD

DATE	ATTENDEES
March 21, 2014	USFWS, CDFW, PVS, Energy Renewal Partners, McCormick Biological, Brian Cypher, PhD

In addition, the USFWS and CDFW provided comments to San Benito County on its DEIR, which the County considered in preparing and then adopting the FEIR.

2.0 PROJECT INFORMATION

2.1 Location of Project

The Project is located near the intersection of Panoche Road and Little Panoche Road, in eastern San Benito County and western Fresno County (**Figure 1**). The Project Footprint is located approximately two miles north of the intersection of Panoche Road and Little Panoche Road. This location is approximately two miles southwest of the Fresno County Line and the Panoche Hills, and approximately 15 miles west of Interstate 5 and the San Joaquin Valley. The Project Footprint would be located within Township 15S, Range 10E, Sections 3-4, 8-11, and 13-16 of the United States Geologic Survey's Cerro Colorado, Llanada, Mercy Hot Springs, and Panoche 7.5-minute topographic quadrangle maps. In addition to the Project Footprint, the Conservation Lands associated with the Project are located in both San Benito and Fresno counties within Township 15S, Range 10E, Sections 3-4, 8-10, 13-16, and 25; Township 15S, Range 11E, Section 19; Township 14S, Range 10E, Sections 21-27, and 32-36; Township 14S, Range 11E, Sections 19, and 29-32; Township 15S, Range 10E, Sections 1-8, and 10-14; Section 15S, Township 11E, Sections 6-7, 19-20, and 26-36; and Township 16S, Range 11E, Sections 1-6, and 8-12 (**Figure 1**). The solar facility and all associated land would be located on property under control of PVS.

2.2 Project History/Background

The Action evolved during San Benito County's 13-month environmental review process under the CEQA and additional biological studies (**Table 4**). PVS applied to the County for a Conditional Use Permit for a 1,000 MW PV solar energy project incorporating approximately 10,000 acres of the Panoche Valley in October 2009. In response to concerns about the size of the Action and potential environmental impacts, PVS worked in collaboration with the County to reduce the project size by almost 60 percent from 1,000 MW on 10,000 acres, to 420 MW on approximately 4,700 acres. The County then prepared a DEIR pursuant to CEQA which analyzed the environmental impacts of a 420 MW Project. The DEIR was made available for public comment on June 28, 2010.

Comments received from the public, the USFWS, and the CDFW raised concerns regarding the 420 MW project's impacts to protected wildlife species, including blunt-nosed leopard lizard (BNLL), giant kangaroo rat (GKR), San Joaquin kit fox (SJKF), and California tiger salamander (CTS). In response to these comments and internal discussions after reviewing the results of biological studies conducted in the spring and summer of 2010, the Action was again reduced in size from 420 MW to 399 MW and was redesigned to avoid the most biologically sensitive areas. These comments were taken into account while revising the DEIR into the FEIR. (The FEIR is available at http://www.cosb.us/Solargen/feir.htm.)

Additional biological surveys were conducted in 2013 to further document the distribution of GKR, BNLL, and SJKF dens. The results of these surveys were used to further refine the Action and Project Footprint. PVS incorporated additional GKR avoidance areas, BNLL avoidance buffers, and a SJKF travel/dispersal corridor. Due to advances in solar panel efficiency and project design, the Action will still have a total output of approximately 399 MW, but will require only 2,492 acres of Project Footprint area.

TABLE 4 VARIOUS PROJECT DESIGNS

DATE PROPOSED	OCTOBER 2009		JUNE 2010		SEPTEMBER 2010		OCTOBER 2013 (CURRENT PROJECT)
Proposed MW Output	1,000 MW	DEIR	420 MW	FEIR	399 MW		399 MW
Acres Impacted	10,900 acres		4,885 acres		2,813 acres		2,492 acres
Acres of Mitigation	4,316 acres		10,331 acres		23,292 acres		24,185 acres

2.3 Project Description

The Action would be located on grazed rangeland and would generally include development of a solar facility (**Figure 2; Table 5**). The approximate 399 MW footprint comprises 2,492 acres (3.9 square miles) in the Panoche Valley located in eastern San Benito County, California. Interstitial spaces between panels will be used for maintenance transportation corridors during operations.

TABLE 5 PROJECT ACREAGE BREAKDOWN

PROJECT FOOTPRINT COMPONENTS	ACRES IMPACTED
Solar array and associated infrastructure and transportation corridors	2,352 acres (directly impacted)
Project perimeter roads	33 acres (directly impacted)
Substation	12 acres (directly impacted)
Laydown area	95 acres (directly impacted)
Total Impacted Acreage	2,492 acres

An additional 2,523 acres interspersed throughout and adjacent to the Project Footprint would be left undisturbed and designated as the Valley Floor Conservation Lands (VFCL). The VFCL would include wildlife movement corridors within on-site drainages and 100-year floodplains, as well as open space in the southern portion of the Project area. These undisturbed areas would remain as open space and would be managed as conservation areas to maintain and enhance habitat conditions for listed species (**Figure 3**).

In addition to the designation of the VFCL, the Action will include two large ranches for conservation/mitigation purposes. These ranches, the Valadeao Ranch Conservation Lands (VRCL; 10,772 acres) and the Silver Creek Ranch Conservation Lands (SCRCL; 10,890 acres), are contiguous with the Project Footprint and each other (**Figure 3**). The combined total acreage to be placed in permanent preservation and management is approximately 24,185 acres.

Management actions that protect, maintain, and enhance the Conservation Lands and corridors between habitat areas on and between the VFCL, SCRCL, and VRCL will create a Conservation Lands system that complements and provides important linkages to other protected lands (e.g., adjacent BLM lands), lands supporting Requested Take Species, and regional conservation efforts. The following will be implemented to protect and enhance Conservation Lands to benefit Requested Take Species:

1. The perimeter of the Conservation Lands shall be fenced to exclude unauthorized access. If new fencing is installed, fencing will be designed with at least three-strand barbed wire, with a fourth (bottom) strand of smooth wire at least eight inches above the ground, and shall be consistent with local BLM guidelines. This fencing design will reduce potential injury to wildlife while clarifying Conservation Land boundaries to the public. Signs shall be placed on boundary

fencing adjacent to public roads or property accessible by the public at 150-500 feet intervals, indicating that entry without access permission is prohibited, and the lands are protected.

2. Litter and illegally dumped wastes shall be removed from the property within the first year of establishing the conservation easement, and at least on an annual basis thereafter. The initial cleanup areas will include at least the sites identified during the initial baseline survey.

3. Any areas where human disturbance already exists that are not needed for long term maintenance, landowner/leasee access, grazing activities, etc. will be restored in such a way as to blend the area into the surrounding habitat. A revegetation specialist with experience restoring western San Joaquin Valley plant communities will assess individual sites to determine restoration methods and appropriate planting procedures and species. If restoration is determined to be warranted, methods will follow the Habitat Restoration and Revegetation Plan.

4. Actions that facilitate regional connectivity for the Requested Take Species through enhancement of corridors and connected portions of the Conservation Lands will be implemented. Implementation shall include: a) habitat enhancement and restoration of former agricultural lands within the Conservation Lands, and b) minimization of new roads and facilities near "pinch points" in the connected Conservation Lands and adjacent protected properties.

5. Provide, on average over the long term, a sufficient population level of Requested Take Species to fully mitigate for the numbers taken from construction of the PVS Facility. When needed, enhance habitat to increase population levels as described below, which are at minimum, the number taken from the construction of the Project.

Specific requirements for maintaining the Conservation Lands will be developed and included in the Conservation Management Plan, Grazing Plan, the Habitat Restoration and Revegetation Plan, the Noxious Weed and Invasive Plant Control Plan, and the Habitat Mitigation and Monitoring Plan for the Proposed Action.

Panel Blocks:

The Action will utilize approximately 2,352 acres to install PV panels over multiple phases of construction. All panels would be oriented to maximize solar resource efficiency. Panel faces would be non-reflective and black or blue in color.

The PV solar panels would be mounted on steel support structures that will stand up to fifteen feet in height. The steel support structures would be constructed of corrosion-resistant galvanized steel.

The solar panels will be arranged throughout the Project Footprint in modular blocks connecting to an inverter system. The purpose of the inverter system is to convert the direct current (DC) energy produced by the panel to alternating current (AC) energy that is required for electric transmission. Rows of panels will be spaced approximately 10 to 35 feet apart (panel edge to panel edge), 35 feet being a worst-case scenario to prevent shading of adjacent rows. The project footprint will include a 15 to 20 foot wide perimeter road that will be used for maintenance and emergency response. In addition, interstitial space between panels will be used for transportation access during maintenance activities. **Figure 2** depicts the preliminary Project Layout.

Electricity Collection Lines and DC-AC Inverters:

Electrical energy in the form of DC generated by the PV panels is collected in combiner boxes and routed to the inverter. A combiner box is a small electrical enclosure, approximately one cubic foot in size, which is mounted on the PV racking system and allows the PV string voltages to be placed in parallel, increasing the DC current. Electricity from panel combiner boxes would be gathered via an underground or rack-mounted DC collection system from the arrays and routed to the centralized inverter system. The inverter systems are typically enclosed and mounted on concrete piers, with the entire structure being approximately 8 feet wide by 40 feet long by 10 feet high. There would be one of these structures per each power block.

The direct current would be converted to AC by the inverters, stepped up by the transformers, and transmitted to the new substation via 34.5 kV (AC) medium-voltage collection lines. The medium voltage collection lines would begin at the inverter system transformers and would terminate in the collection breaker of the substation. The medium voltage lines will be routed to the substation using either standard wood pole overhead lines or trenches with buried cables. These wood poles would be approximately 25 feet in height and spaced about 250 feet apart. The most recent Avian Power Line Interaction Committee (APLIC) guidelines for avian protection, as well as a Bird and Bat Conservation Strategy will be implemented on overhead structures and lines. Additional information on the APLIC guidelines and Bird and Bat Conservation Strategy is provided in Section 5.5 of this report.

The Project will employ trenching for burial of a number of electrical runs, typical of utility scale power plants. The electrical lines in these trenches would carry either DC or AC and various voltage ranges, with each line type in separate trenches or spaced laterally or vertically as appropriate.

Example trench types include:

- Module harness leads between rows to reach combiners
- Collecting combiners to feed PCS
- Weather stations to PCS
- Feed power to tracker motors
- Collecting PCS pads to feed the substation

Between rows of modules, small trenches may bring the module cable harnesses to the nearest combiner, if sized for more strings of modules than are in a single row. The combiner outputs are collected in trenches leading back to the Power Conversion Station (PCS) pad and feeding the inverters. These combiner trenches may be shared with other lines from the PCS feeding tracker motors on the racking system if trackers are used in the project.

From the PCS pads, trenches are used again to collect their outputs and convey the power to the substation. From the numerous PCS pads, the trenches would typically connect groups of 20-30MW of PCS pads and may run longer distances to reach the substation. Depending on the terrain features between the PCS pads and substation, some limited sections of overhead lines may be used instead of trenching to avoid disturbing the ground.

Electric Substation and Switchyard

An electrical substation will convert power from 34.5 kV to 230 kV. The substation will be located directly adjacent to the existing Pacific Electric and Gas (PG&E) transmission line (**Figure 2**). An on-site access road will be constructed to serve the substation, as well as an approximate one-acre fenced-in parking area. The substation output will be connected to a 230-kV switching station which will be owned and operated by PG&E; the switching station provides protective relays and breakers to manage interface with the 230-kV grid system. The substation and switchyard equipment will cover approximately 9 acres of the 12-acre area. The equipment and facilities in the substation and switchyard will range in height from approximately 3 to 35 feet (with the exception of the potential microwave tower discussed below). The substation and switchyard sites will be graded and compacted to an approximately level grade. Several concrete pads will be constructed as foundations for electrical equipment, and the remaining area will be covered with gravel. Equipment used within the substation and switchyard will include electrical transformers, switchgear, and related substation facilities designed and constructed to transform medium-voltage power from the Project's delivery system to PG&E's existing 230-kV transmission line. Presently, the electrical substation is located on the south side of the transmission line; however, the substation may need to be moved to the north of the transmission lines if required by PG&E after their final evaluation of system design requirements.

PG&E Telecommunication Upgrades

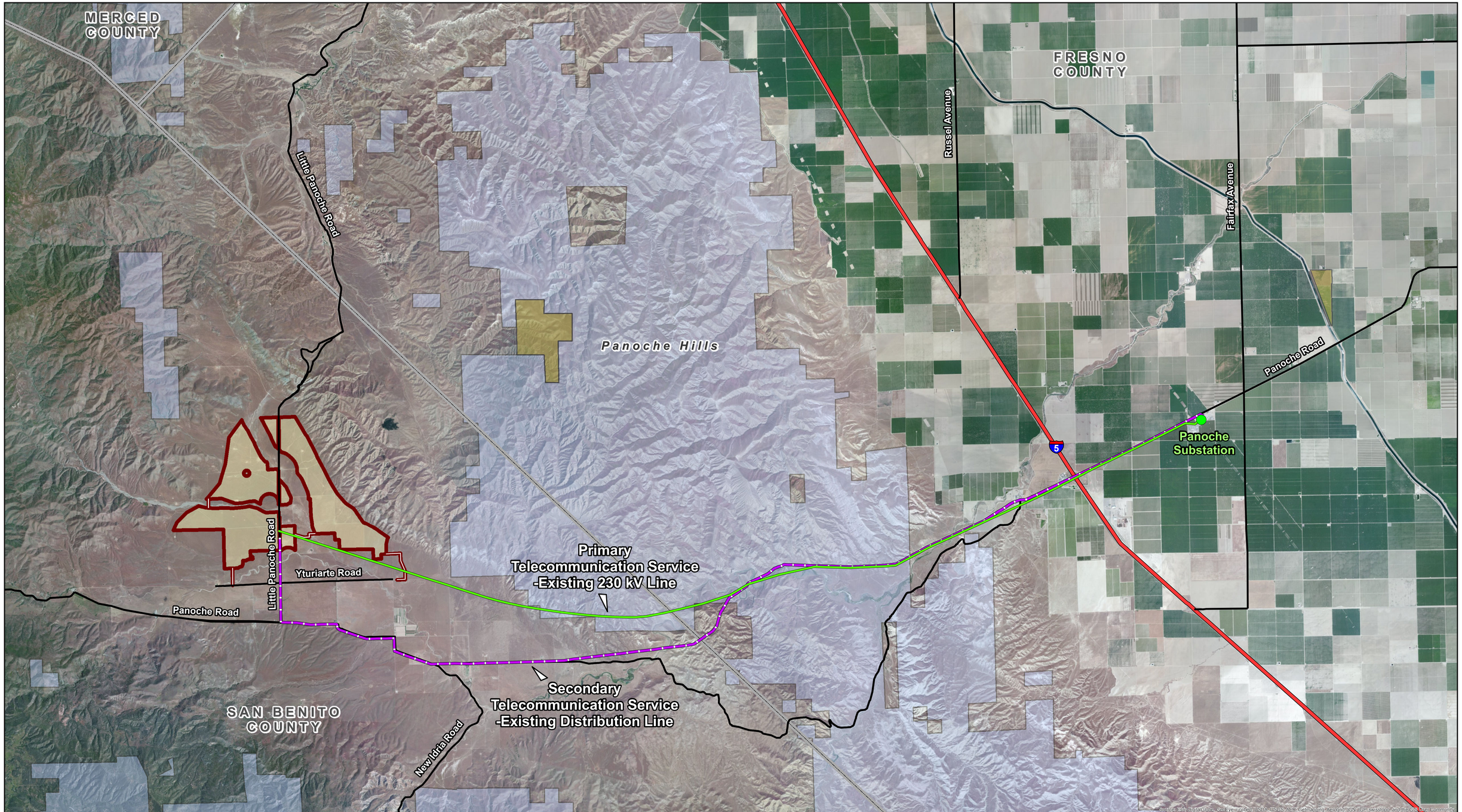
The California Independent System Operator (CAISO), the electricity grid operator in California, in combination with the interconnecting utility, PG&E, are responsible for ensuring grid reliability. These two entities are tasked with determining the transmission system impacts of the proposed Project and any measures needed to ensure system conformance with utility reliability criteria. A study was conducted by CAISO dated September 18, 2013 in coordination with PG&E per CAISO Tariff Appendix DD Generator Interconnection and Deliverability Allocation Procedures. The study identified various systems upgrades necessary to support interconnection of the Project to the electrical grid, including primary and secondary telecommunication services to allow for data transmission between the Project and the electrical grid. These upgrades are considered Connected Actions to the Project.

In addition, telephone and data internet service is needed to support communications to and from the Project site during construction and O&M phases of the Project. Telephone and data internet service will be provided by AT&T. The telephone and data internet service is also a Connected Action.

PG&E Primary Telecommunication Service

It is anticipated that PG&E would install optical ground wire (OPGW) on its existing 230-kV transmission line to establish the primary telecommunication service between the substation at the Project site and the Panoche substation located 17 miles to the east of the Project. This is a routine method of providing telecommunication services between electrical substations and generating facilities or other substations and, as illustrated in PG&E's current San Joaquin Valley O&M Habitat Conservation Plan (HCP; see Section E6, page 2-21), is considered maintenance to existing electrical infrastructure (Jones & Stokes. 2006). **Figure 4A** depicts the primary telecommunications route described herein. The purpose of the OPGW is twofold: for system protection and for control of the transmission line. OPGW is designed to replace traditional shield wire, which protects the line by providing a path to ground by handling electrical faults like shield wire with the added benefit of containing optical fibers, which can be used for telecommunications purposes.

Given that the existing 230-kV transmission line currently has shield wire installed; PG&E would replace the shield wire with OPGW by using the existing shield wire to pull OPGW through the line. It is



Energy Renewal PARTNERS, LLC

BR
2/13/2014

Legend

- Project Footprint
- BLM Land
- State Land
- Distribution Line
- Existing 230 kV Transmission Line

N

0 2,000 4,000 8,000
Feet

Panoche Valley Solar Project

Telecommunication Upgrades

Figure
4A

anticipated that PG&E would require approximately eight splice sites and sixteen pull sites along the existing 17-mile transmission line corridor to complete installation of the OPGW. These splice and pull sites would require an approximate 100 feet by 100 feet work area centered at each tower site. At the remaining tower sites used only as attachment sites, the work area would be approximately 25 feet by 25 feet. Moreover, some minor upgrades to the seventy-five existing structures along the 17-mile 230-kV transmission line route may be required to accommodate installation of the OPGW. No additional work area would be needed by PG&E to perform these minor upgrades to the existing structures. Existing roads would be used to provide access, and existing maintenance pads at each structure site would likely provide sufficient work area to stage equipment needed to pull the OPGW and perform the attachments needed at each site.

Construction would be completed using a combination of helicopter and ground crews, unless it is determined to be infeasible during PG&E's engineering review. Helicopters would be used to transport qualified electrical workers to the towers, deliver materials, and assist in pulling the OPGW from tower to tower. If the use of helicopters is feasible, the need for crews to enter the attachment tower sites would be eliminated. Ground crews would install eight splice boxes and set up sixteen pull sites. Typical construction vehicles for these activities would include pickup trucks, a bucket truck or man-lift, and a crane. Overhead crossings of public roadways would require the use of temporary guard structures. The temporary guard structures are designed to prevent tools or materials from falling into the roadway. A typical guard structure would include four 60- to 80-feet-tall wooden poles in a large pot; two pots would be placed on each side of the roadway with netting affixed to the top of each pole. It is anticipated that the pots would be placed in or adjacent to the disturbed road shoulder. No grading, vegetation removal, or ground disturbance is anticipated associated with installation of the guard structures.

To the east of the Project site, the PG&E Right-of-Way (ROW) traverses BLM administered land in the Panoche Hills. The BLM property crossing is approximately eight miles in length and located to the south of the Panoche Hills South Wilderness Study Area. No new impacts to sensitive habitat or resources are anticipated as part of the OPGW installation within the ROW crossing BLM land because the OPGW would be installed on existing structures using existing access roads. This work would be considered maintenance of the existing 230-kV transmission line by the BLM. PG&E would coordinate with BLM as needed to confirm that the scope of work necessary to install the OPGW on the existing 230-kV transmission line along this 8-mile segment is included in the existing ROW agreement(s) between PG&E and BLM.

In accordance with the description of work activities above, impacts to sensitive species and habitat will be minimal as no new permanent structures will be necessary. The work along all 17 miles would be of short duration and should be complete in approximately 6-8 weeks. Existing roads, maintenance pads, and the existing transmission line will be used to install the OPGW, and PG&E will implement the same methods in the execution of the work that they employ when performing maintenance activities on their electrical system. While many of the same sensitive species discussed in Section 4 of the Biological Assessment may be observed along access roads and at transmission tower sites; we expect PG&E will employ robust avoidance and minimization measures for these sensitive species and their habitat. PG&E will utilize existing federal permits for covered practices and/or will obtain, if necessary, the applicable federal ESA permit(s) to complete the described work. Specifically, measures to avoid impacts to sensitive species and their habitat include:

- Crews will be educated about sensitive species in the area, and a qualified biologist will perform surveys of work areas prior to the start of work.

- Work will occur during daytime hours, minimizing potential impacts to giant kangaroo rat and other nocturnal species.

- Vehicles and equipment will remain on existing roads and will maintain low speeds in areas where sensitive species are known to occur. Reducing speeds will avoid and minimize impacts to special-status reptiles and mammals in the area.

Details on these avoidance and minimization measures are discussed in Section 2.4. These measures, in conjunction with the inherent nature of the work being conducted, will minimize potential impacts to sensitive species and habitat.

PG&E Secondary Telecommunication Service Preferred Alternative

To meet PG&E's standards, two physically redundant communication paths for connectivity will be required. In addition to the OPGW installation on the existing 230 kV transmission line structures described above, PG&E will establish a secondary system. The preferred alternative for a secondary system would be the installation of a microwave system to achieve the required system protection. The final determination of the secondary system will be made after PG&E has completed additional engineering studies. As illustrated in **Figure 4B**, an initial study showed that a microwave system could be established between the Project and Panoche substation by installing three microwave towers. If PG&E selects the microwave option alternative, it is anticipated that the three microwave towers would be installed at the existing Panoche Substation, at the Project substation, and at least one microwave repeater on the ridgeline of the Panoche Hills to provide line-of-sight communications between the two substations.

The microwave towers constructed at the Panoche and Project substation would be approximately 100-feet tall and would be located within the fence line of the two substations. The tower site providing line-of-sight between these two locations will consist of a fenced 100 feet by 100 feet area containing a communication building, a communication tower, and a back-up power source, typically a generator with a diesel or propane fuel tank. The tower would be a free-standing, four-legged lattice steel structure occupying an approximate 30 feet by 30 feet area with a height of approximately 300 feet to achieve line of sight between the Project site and the Panoche substation microwave towers. Communication buildings are typically 36 feet by 12 feet and would be delivered to the site prefabricated by truck and installed on a concrete slab using a crane. Distribution power would be brought to the site from the existing distribution poles along existing access roads. At least one additional distribution pole may be needed and construction would employ the same methodology as described previously. The inset on **Figure 4B** shows the route for the connection of the tower site to the existing nearby distribution line power.

A preliminary review demonstrates that the microwave tower could be constructed on private land outside of BLM-administered land along an existing access road to the south of PG&E's existing 230-kV transmission line shown on **Figure 4B**. While it appears existing roads could be utilized to access the proposed tower site, minor road improvements may be necessary to allow trucks to transport equipment and materials to the work site.

In addition, minor grading of the tower site and excavation to install the tower foundation will be necessary. As part of the Federal Communications Commission (FCC) approval process, PG&E would survey the location of this area for biological and cultural resources prior to siting the tower; thus, the exact placement of the tower site can avoid adverse impacts to sensitive habitat or resources. Last, the height of the microwave tower may require Federal Aviation Administration (FAA) filings and approval, including a requirement to install FAA-lights on the microwave tower.

As discussed above, impacts to sensitive species and habitat will first be avoided through siting of the microwave site along with use of existing roads to access the microwave site. As shown on **Figure 4B**,

MERCED COUNTY

FRESNO COUNTY

SAN BENITO COUNTY

Panoche Hills

Little Panoche Road

Russel Avenue

Fairfax Avenue

Panoche Road

Yturiarte Road

New Idria Road

5

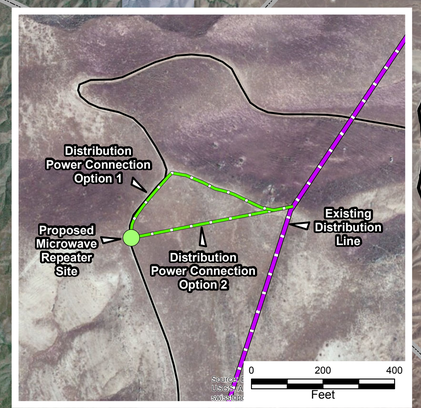
Panoche Substation

Secondary Telecommunication Service -Microwave Towers

See Inset

Primary Telecommunication Service -Existing 230 kV Line

Proposed Access Road



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2/17/2014

Legend

- Project Footprint
- BLM Land
- State Land
- Proposed Microwave Repeater Site
- Microwave Line of Sight
- Existing 230 kV Transmission Line
- Existing Distribution Line

N

0 2,000 4,000 8,000
Feet

Panoche Valley Solar Project

Telecommunication Upgrade Alternative

Figure
4B

the microwave site could be located in Fresno County and, therefore, it may be within the coverage area of the approved San Joaquin HCP. However, while it is not clear that the HCP would specifically cover construction of this site, it is expected that all minimization and mitigation measures for covered species in the HCP will be adhered to by PG&E during the siting and construction of the microwave site. PG&E will utilize existing federal permits for covered practices and/or will obtain, if necessary, the applicable federal ESA permit(s) to complete the described work. Specifically, measures to avoid and minimize impacts to sensitive species and their habitat include:

- Crews will be educated about sensitive species in the area, and a qualified biologist will perform surveys of work areas prior to the start of work.

- Work will occur during daytime hours, minimizing potential impacts to giant kangaroo rat and other nocturnal species.

- Vehicles and equipment will remain on existing roads and will maintain low speeds in areas where sensitive species are known to occur. Reducing speeds will avoid and minimize impacts to special-status reptiles and mammals in the area.

Additional details on these avoidance and minimization measures are discussed in **Section 2.4**. These measures, in conjunction with the relative small footprint of the impact and inherent nature of the work being conducted, will avoid and minimize potential impacts to sensitive species and habitat.

Communications to Moss Landing and Coburn

PG&E will have telecommunications between the Moss Landing, Coburn, and Panoche substations and the Project. In addition to the installation of OPGW from the Panoche substation, PG&E will utilize power line carrier (PLC) and leased line systems to connect the remaining two substations at Moss Landing and Coburn; the implementation of these systems will involve minor modifications to the existing switchyards at Moss Landing and Coburn substations. Essentially, PLC is a system that uses the power conductors between substations to transmit low speed serial data for relay protection communications through existing electrical lines. The Moss Landing switchyard connection will use a PLC system to provide permissive overreaching transfer trip (POTT) and connections to Coburn switchyard will be a PLC and a leased line circuit to provide POTT and DTT (direct transfer trip) capabilities. The leased line service is anticipated to be provided by AT&T and would be a point-to-point high-speed serial data connection between Coburn and the Project substations for protection relay communications. If not already established, additional poles and cables may need to be placed in the public ROW from the nearest AT&T point of service to the substation fence line. All other work at the Moss Landing and Coburn substations will take place within the existing substation fence line, and no new ground disturbance is anticipated.

Environmental Review of PG&E Telecommunications Upgrades

Maintenance activities along PG&E's transmission and distribution lines, if not already authorized by existing agreements, would likely qualify as categorical exclusions under CEQA and NEPA. Microwave tower activities would require permits and the appropriate level of review from FCC and the FAA. As stated above, PG&E will utilize existing federal permits for covered practices and/or will obtain, if necessary, the applicable federal ESA permit(s) to complete the described work. Compliance with Section 106 of the National Historic Preservation Act would be conducted as part of the FCC approval processes when final engineering is completed and exact ground disturbance locations are identified.

On-Site Telephone and Data Service

Telephone and internet services to the Project site would be provided by AT&T utilizing existing AT&T services located 2,000 feet south of the Project site along Little Panoche Road. AT&T's preferred method of installation would be to install new copper cables underground in the public road shoulder from the existing connection point to the Project site. The route of the AT&T cable package installation is shown in **Figure 4C**. Installation would include construction of a two-feet-wide by three-feet-deep trench to allow direct burial of the cable in compliance with state and local standards. The cables would then connect to a Network Interface Unit (NIU) measuring approximately 36 inches tall by 12 inches wide and 12 inches deep. The NIU would be placed at the end of the cable trench line near the Project site. In the alternative, the cable could be attached to existing wood distribution poles along the road from the existing AT&T connection point to the Project site. It is anticipated that PG&E would install cables on the existing distribution line by attaching the cables to wooden cross-arms on each distribution pole using a bucket truck that would park next to the pole and allow the qualified installer to add required attachments. For attachment at each pole, an approximate 10 feet by 10 feet work area would be needed. Since existing facilities will be utilized to bring the AT&T services to the Project site, no impacts to sensitive habitat and resources are anticipated to occur in association with this work on private easements and public ROW lands.

Operations and Maintenance Building:

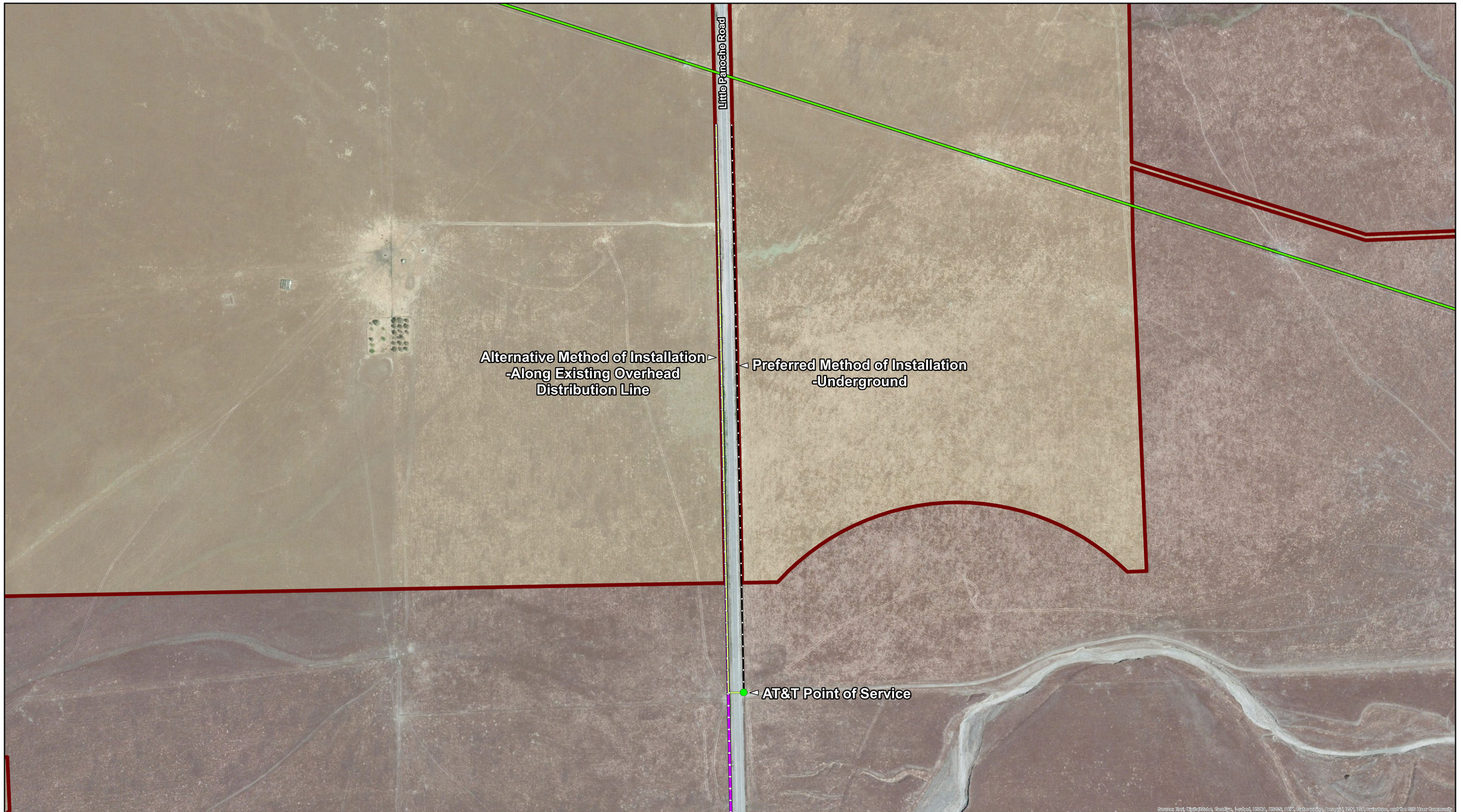
The Operations and Maintenance (O&M) building will be located inside the substation fence and will be built to local codes and standards. The approximately 5,000 square foot facility would consist of a standard steel building on slab at a maximum height of twenty feet. The facility would provide office space, a meeting room, equipment to support operations and maintenance, parts storage, as well as security and site monitoring equipment.

Security Fencing:

The fence around the Project Footprint will have a 12.7 to 15.2 centimeter (cm) (5 to 6 inch) gap along the bottom of the chain linked fence, that would allow wildlife to travel through the site and link up with the existing travel corridors (Cypher, B.L, C.L. Van Horn Job, 2009). A fencing option to the chain linked fence would be an inverted "deer" fence that would have larger rectangular openings on the bottom to allow the specific T&E species to pass through. These fencing designs have been previously approved or suggested by the CDFW and USFWS for other solar projects. Fences surrounding the O&M building would utilize the same fencing plan, unless it is determined to be unnecessary to provide additional protection of protected species. A comprehensive environmental fencing plan will be developed and submitted by the agencies prior to construction. Gated eight-foot high chain link fences, with possible animal exclusion modifications if needed, would be constructed around the substation per the PG&E standard. Temporary wildlife exclusion fencing would be placed around construction staging areas, as needed for wildlife protection.

Species Exclusion Fencing:

The primary function of the temporary species exclusion fencing is to prevent special status, small vertebrate species (e.g. GKR, BNLL, CTS) from entering the construction sites where they can be killed, injured, or isolated or to provide directional control within the Project Footprint. In general, wildlife exclusion fencing is to be installed before any ground disturbance, equipment laydown, site preparation, or construction activities as deemed necessary by the Designated Biologist. The exclusion fencing will be equipped with one-way exits every 250 to 500 feet to avoid entrapment of species inside the fence. Care should be taken in exclusion fencing design should cattle or sheep be expected to be adjacent to the



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BR
2/14/2014

Legend

- Project Footprint
- Existing 230 kV Transmission Line
- Existing Distribution Line
- Underground Route
- Overhead Route

N

0 75 150 300
Feet

Panoche Valley Solar Project

AT&T Telecom Support

Figure
4C

fencing. The exclusion fencing will be removed after the completion of construction in the area. The exclusion fencing will be detailed in the Project's Comprehensive Fencing Plan.

Temporary Water Supply Ponds:

Temporary water supply ponds will be constructed within the Project Footprint. The water from these ponds will be used to water graded/excavated areas and active unpaved roadways, unpaved staging areas, and unpaved parking areas. The frequency will be based on the type of operations, soil, and wind exposure. The watering will assist in the reduction of fugitive dust accumulation, the amount of wind erosion and dust generated by exposed topsoil, the possible exposure to Valley Fever from dust generated by construction and traffic, and the impacts to vegetation from fugitive dust. Three temporary ponds are planned within the Project Footprint **(Figure 2)** and have the combined capacity of approximately 1,626,000 gallons and will take up approximately 1.5 acres of the Project Footprint. The ponds will be surrounded by species exclusion fencing to restrict access by special status species. Based on pumping rates expected from water wells at the site, the ponds would be filled during the night and over the course of the day to capacity and will be nearly drained from water utilization each day. This will eliminate any significant amount of standing water that would assist in the creation of special status species habitat (e.g. branchiopods species). In addition, up to five new water wells will be drilled, if existing water wells cannot be utilized to fill the temporary construction ponds.

2.3.1 Proposed Construction Schedule/Phasing Plan

Permanent disturbance would result from the construction of Project Footprint perimeter roads and emergency access/egress points, maintenance transportation corridors, the substation and O&M facility, parking areas, solar array footers, and equipment pads. Temporary disturbance to the Project Footprint would result in initial site preparation from trenching for electrical conduit, grading of areas with slopes greater than three percent, construction staging and laydown areas, and temporary access roads (**Figure 2**). The temporary trenching and temporary access roads associated with the construct of the solar facility will take place in areas of the Project Footprint that are designated as permanent impact areas. The areas of potential grading that have slopes greater than three percent have a combined acreage of approximately 767 acres, and the construction staging and laydown areas have a combined total acreage of 95 acres. If the grading of areas with slopes greater than three percent is not required for the construction of the facility, it will be avoided.

The Action would be constructed in phases over multiple years. Construction is anticipated to begin in late 2014 to early 2015. The first phase will be installed in the portion of the site that is west of Little Panoche Road and the northern most region of Project Footprint east of Little Panoche Road. To provide the necessary mitigation offsets, the VFCL and the SCRCL will be acquired by PVS before the start of construction. The second phase will complete the installation on the Project Footprint (**Figure 2)**, which will bring the total project installed capacity of approximately 399 MW. PVS will acquire the VRCL to support the second phase of construction.

Portions of the Project Footprint that would be temporarily disturbed during construction would be restored in accordance with a revegetation plan. Revegetation will be conducted on areas temporarily disturbed during construction to restore vegetative cover to similar to pre-construction condition once site work in those areas of temporary disturbance is completed. Temporarily disturbed areas will be reclaimed by appropriate contouring, where needed, and replanting with a seed mix as provided in a revegetation plan. All seed mixtures will be certified "weed free." Noxious weeds will be controlled through implementation of the Noxious Weed and Invasive Plant Control Plan.

2.3.2 Site Preparation

Site preparation would mainly include construction of access roads, intermittent stream crossings, and implementation of storm water best management practices (BMPs). Project grading requirements are anticipated to result in cut-and-fill activities with no cubic yards of export. Aggregate will be imported for the permanent roads and the substation.

Preparation of land areas for array installation will involve trimming of grassland vegetation (as needed), agricultural disking, harrowing and/or rolling of PV array areas, selected compacting, and grading. For the majority of the Project Footprint, the ground under the PV arrays will not require grading, except for areas that are greater than three percent slope. Preparing the ground beneath PV arrays will begin by trimming existing vegetation as close to the ground as possible by mowing or grazing. An agricultural tool, such as a disk, harrow, or cultipacker will then be used to loosen and smooth the top one to three inches of soil. Finally, a smooth steel drum roller, or similar equipment, will be used to bring the top four to six inches of soil to the appropriate compaction value. Beneath the compacted surface of the soil, the soil will remain at the existing level of compaction.

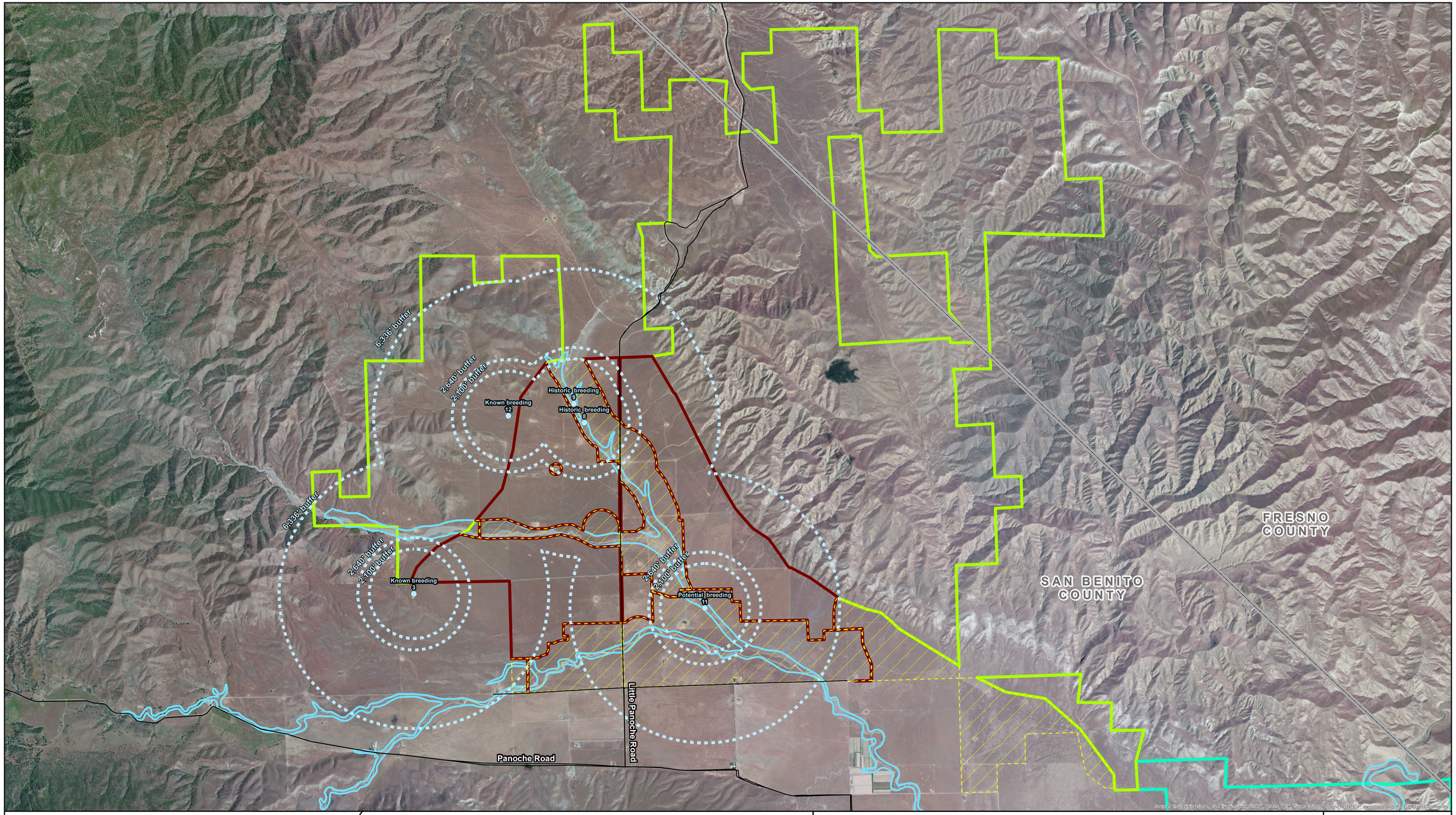
The Project O&M building will be accessed from Little Panoche Road and included in the substation area. Project roads will be limited to 20-foot (maximum) wide perimeter road with pullouts up to every 2,000 to 5,000 feet, as required by the Hollister Fire Department. Pullouts will be approximately 20 feet wide by 300 feet long. Portions of the perimeter roads that cross on-site federally jurisdictional washes will only be used for emergency access. Disturbance from perimeter roads and pullouts is limited to 44.4 acres. Interstitial space shall be used as transportation corridors between the rows of panels as needed for maintenance. Portions of the transportation corridors will be maintained dirt paths to ensure needed access. An additional transportation corridor, a maintained fenced off dirt path, will be placed south of Aquilas Creek, but north of the perimeter fence line. This transportation corridor will be utilized by VRCL management personnel (e.g. ranchers, scientist, and other necessary conservation land manage personnel) to access the western portion of the VRCL from Little Panoche Road.

Table 6 presents the potential road impacts associated with the Action.

TABLE 6 POTENTIAL ACCESS ROAD IMPACTS

Access Road Type	Length (feet)	Width (feet)	Area (acres)
Perimeter access roads with pullouts	91,122	20-40	44.4

Emergency egress and access roads for the Project will cross Panoche Creek in two locations and Las Aquilas Creek in one location (**Figure 5**). Of these three crossings, only two of these locations cross jurisdictional waters of the U.S. per the preliminary jurisdictional letter from the USACE San Francisco District dated October 18, 2010. The PVS Facility has proposed that the two jurisdictional creek crossings (**Figure 5**) be single-span bridges. The proposed span lengths and area impacted by each of the crossing are described in **Table 7**. These crossings, as well as the crossings of washes, creeks, and drainages that are potentially waters of the state and regulated by CDFW will also be permitted through the submittal of a Lake or Streambed Alteration Agreement (LSAA) Notification.



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BR
10/16/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands
- Known CTS Breeding Pond
- CTS Pond Buffer
- 100-year Floodplain

N

0 1,000 2,000 4,000
Feet

Panoche Valley Solar Project

California Tiger Salamander Ponds

Figure
6

TABLE 7 DRAINAGE CROSSING IMPACTS

	Las Aquilas Crossing 1	Panoche Creek Crossing 2
Width between tops of banks (linear feet)	56 feet (ft)	53ft
Width of Ordinary High Water Mark (linear feet)	48.1 ft	20 ft
Area of Impact[1] within Ordinary High Water Mark (square feet)	96 ft^2	4 ft^2
Volume of material that will be disturbed[1] within Ordinary High Water Mark (cubic yards[yd^3])	11 yd^3	20 yd^3
Area of Impact[1] outside of Ordinary High Water Mark (square feet [ft^2])	192 ft^2	320 ft^2
Volume of material that will be disturbed[1] outside Ordinary High Water Mark (cubic yards)	20 yd^3	20 yd^3

[1] Volume of disturbed material includes fill and excavation of soil or other material.

2.3.3 Construction and Installation

Power Block Installation:

Panel components, such as the PV panels and racks, will be transported to the laydown areas. All items will be transported to the Project by truck and then be distributed throughout the Project Footprint using various forms of rolling stock. During construction and installation, all traffic would enter the Project Footprint at specified access points along Little Panoche Road.

A racking system will arrive on-site to be assembled and grounded at the site. PV panels will arrive at the site and be placed in a staging area inside shipping containers. Panels will be put in place and secured to the rack per vendor specifications. The rack will be populated with panels, wired in series, and connected to a DC combiner box, which will deliver DC power to the inverters. Equipment used for system installation will include 4x4 forklifts, ATV vehicles, truck-mounted pile drivers, cranes, and pick-up trucks.

Approximately 95 acres are planned for laydown and staging purposes. Each laydown area will be located at a convenient spot for construction traffic to access from existing roads. The staging areas will only require a power source for temporary lighting. There will be no hazardous substances stored on-site outside of approved containment measures.

Nighttime Construction:

Nighttime activities at the Project will be limited in nature. Nighttime activities will include limited non-ground disturbing construction such as commissioning and maintenance activities to be performed when PV arrays are not energized; interior use of the operations and maintenance facility; unanticipated emergencies (defined as an imminent threat to life or a significant property interest), including non-routine maintenance that requires immediate attention; special status species impact avoidance and minimization activities and research (e.g. GKR trapping and SJKF radio telemetry); and security patrols. No panel installation or ground disturbing activities (including but not limited to grading, pile driving, trenching) will take place at night. From 7pm to 7am generators within 350 ft of project boundary will not run at 100 percent load or will be less than 40dBA Ldn at the property line. No work will be completed during a rain event unless it is required, such as an imminent threat to life, necessary T&E species work, or a significant property and/or construction interest. A Designated Biologist or Biological Monitor will be present during all construction activities.

Other construction work and standard operations and maintenance activities will be limited to daytime hours (5:00 am to 9:00 pm).

Construction Personnel:

The workforce at the Project will vary based on activity at the site during the course of construction. Nighttime activities will be limited to crews of 20-100. Daytime crews will range from 100-500 individuals.

Transportation:

PVS intends to construct the project in phases over multiple years using up to three 8-hour shifts per day and to offer shuttle service to transport employees to and from the primary workforce areas of Hollister, San Benito County, and Fresno County that are located between 10 and 60 miles from the Project. Shuttle service will be used to limit the number of individual vehicles driving to the Project on a daily basis.

It is anticipated that approximately 15-100 large trucks per day will access the Project to deliver material and equipment. A few trucks containing oversized loads also will access the Project Footprint, but will be infrequent when compared to daily truck traffic.

Auto trips include all passenger vehicle trips that will be generated by the Project. These trips will mainly represent employee trips to and from the Project throughout their work shifts, for employees not using shuttles. As stated previously, the workforce for the Project will vary based on activity at the site during the course of construction. Crews of 20-100 for nighttime activities and 100-500 individuals for daytime crews are anticipated. The daily traffic generated by project construction workers was estimated based on work shift information and the assumption that employees will utilize the provided shuttle service. The Project will generate the greatest amount of auto traffic from 5:00 to 6:00 AM during the arrival of employees for the day work shift and from 2:30 to 4:00 PM during the departure and arrivals of employees from shift change. Based upon existing traffic count data, the identified peak project traffic will not coincide with the peak existing traffic along surrounding roadways.

The expected truck traffic generated by the Project will mainly be composed of trucks delivering solar panels, materials, and equipment to the site. It is anticipated that approximately 15-100 large trucks will access the Project Footprint on a daily basis to deliver materials and equipment. It is assumed that the trucks will arrive to the site evenly distributed between and hours of 6:00 AM and 6:00 PM.

The Project will operate seven days a week during daylight hours and will require 10 full time employees initially and up to 50 full-time employees at build-out. They will be expected to travel to and from the site in personal vehicles. A major focus of the operations of the Project will be monitoring system operational status, performance, and diagnostics from the main control room. Operations activities will include meter reading and production reporting. Security personnel will be on-site every hour, every day, working in approximately 8-hour shifts.

2.3.4 Operations and Maintenance

The Action will be in operation for at least 35 years, with the possibility of a subsequent re-powering for additional years of operation. The Action will operate seven days per week during daylight hours. Operational activities will consist of monitoring system operational status, tracking system controls and mechanical equipment, performance, and diagnostics. Operations activities will include meter reading and production reporting by the Supervisory Control and Data Acquisition (SCADA) system, along with updating O&M manuals and activities.

The operations staff will be approximately 10 persons for the first year and up to 50 persons once construction has been completed for the entire project.

Security:

The Project Footprint will be fenced to prevent access by the public in order to ensure public safety and protect equipment from theft and vandalism. Gates will be installed at all Project Footprint access roads. The Project Footprint will provide 24-hour security at the site, security staff will routinely traverse the site, utilizing Project roads, in lightweight vehicles or all-terrain vehicles. The Project Footprint will be equipped with day/night closed-circuit security cameras and will use human-activated motion lighting.

Maintenance:

Once installation is complete and the site is fully operational, all traffic will enter the Project Footprint at access points along Little Panoche Road. Inverters will be periodically checked for general component maintenance. The PV field will be inspected periodically for the degrading of wires, panels, and combiner boxes, as well as for mechanical fastener tightening. The SCADA system will also identify areas that are underperforming; these will be checked as required using project roads and transportation corridors. Damaged or underperforming PV panels will be replaced as required; mechanical fasteners will be replaced as needed. Inverters that are underperforming or have stopped working will be diagnosed by the electrician and, if required, an inverter technician will be brought on-site. The maintenance staff will traverse the site as necessary, utilizing Project roads, and if possible lightweight vehicles or all-terrain vehicles.

Lighting:

During operation of the Project, motion-sensor lighting will be used throughout the Project Footprint. Constant lighting, at a low level, will be required at the O&M building. This will be a single lamp source near the entrance of the building, which will be activated by a timer. All lighting will have a power switch to conserve energy when the lighting is not required. All lighting will point downward and be shielded to preserve dark skies, and will adhere to San Benito County's Lighting Ordinance (SBCo 19.31.003- 009) for areas in Zone 3 and under Class 2 lighting regulations.

Fire Safety:

Four water storage tanks, holding approximately 4,000 gallons per tank, will be located at on-site water well sites. These tanks will have universal adapters to enable fire trucks to refill with water at the Project in an emergency situation. Wash crossings of waters of the U.S. on the perimeter roads will only be utilized by emergency vehicles.

2.3.5 Decommissioning Plan

The Project will be in operation for at least 35 years, with the possibility of a subsequent re-powering of the Project for additional years of operation. Upon its eventual decommissioning, PVS will be responsible for the removal, recycling, or disposal of all solar arrays, inverters, transformers and other structures on the site including roads and bridges. PVS anticipates using the best available recycling measures at the time of decommissioning. The switchyard will be owned and operated by PG&E, and decommissioning will be based on the PG&E codes and standards in effect at that time.

The Project will be constructed with numerous recyclable materials, including glass, semiconductor material, steel, and wiring. When the Project reaches the end of its operational life, the component parts will be dismantled and recycled. All waste resulting from the decommissioning of the facility will be transported by a certified and licensed contractor and taken to a landfill/recycling facility in accordance with all local, State, and federal regulations. Decommissioning will include the following:

- The facility will be disconnected from the utility power grid.
- Individual PV panels will be disconnected from the on-site electrical system.
- Individual PV panels will be unbolted and removed from the support frames and carefully packaged for collection and return to a designated recycling facility for recycling and material re-use.
- With exception of the switchyard, the electrical interconnection, transmission, and distribution cables above ground will be removed and recycled off-site by an approved recycling facility.
- Underground conductor will be abandoned in place with the ends cut 3 feet below grade.
- PV panel support steel and support posts will be removed and recycled off-site by an approved metals recycler.
- Electrical and electronic devices, including inverters, transformers, panels, support structures, lighting fixtures, and their protective shelters will be recycled off-site by an approved recycler.
- Fencing will be removed and recycled off-site by an approved metals recycler.
- Bridges and gravel roads will be removed; filter fabric will be bundled and disposed of in accordance with all applicable regulations. Road and bridge areas will be backfilled and restored to their natural contour.
- Soil erosion and sedimentation control measures will be re-implemented during the decommissioning period and until the site is stabilized.
- All permits related to decommissioning will be obtained where required.

2.4 Proposed Conservation Measures/Conservation Package

The Applicant has proposed the following general and species-specific conservation measures to minimize impacts to biological resources which may occupy the Project Footprint. General and species-specific conservation measures were created through numerous consultation meetings with USFWS, CDFW, and other non-government organizations which have occurred since the inception of the Action, and through San Benito County's preparation of a FEIR for the Project pursuant to CEQA (see **Section 1.4**).

As described above, the Action has conducted over 25,000 hours of biological surveys on the Project Footprint, and based on the results and associated habitat evaluations, the Project Footprint has been significantly reduced in size and its design significantly altered so as to avoid the highest concentrations of T&E Species and the highest quality habitat for such species.

2.4.1 General Proposed Avoidance and Minimization Measures

The Applicant will implement the following BMPs in order to minimize potential impacts on T&E Species. Many of these measures are also described in the FEIR. The Project shall have biological monitors on the site throughout construction activities.

1. Before commencing on-site construction activities, the Permittee will submit to CDFW and USFWS the name, qualifications, business address, and contact information of one or more Designated Biologists. The Permittee shall ensure that each Designated Biologist is knowledgeable and experienced in the biology, and natural history of the T&E Species on the Project. The Designated Biologist(s) shall be responsible for monitoring construction activities to help minimize and fully mitigate or avoid the incidental take of individual species and to minimize disturbance of T&E Species' habitat. The Designated Biologist may appoint biological monitors to perform biological surveys or provide oversight of ground disturbing activities as needed in their place. All biological monitors that work on-site will receive instruction from and report to the Designated Biologist(s).

2. Prior to surface disturbance or other covered activity, a Designated Biologist shall conduct a T&E Species education program (tailgate briefing) for all Project personnel, which familiarizes the Applicant's employees and contractors with occurrence and distribution of T&E Species in areas impacted by the Action; take avoidance measures being implemented during the Project; BMPs; reporting requirements if incidental take occurs; and applicable definitions and prohibitions under the CESA and other measures regarding federal and state listed species. This program is designed to ensure all personnel who work at the Project are aware of and can identify the federal and state listed species and the measures implemented to protect these species. In addition, contact names and numbers are given to which personnel can report incidents regarding federal and state listed species. An employee environmental awareness program will be administered to all new employees and to all other employees every two years. Upon completion of the program, the employees are given a badge that is required for admittance onto the Project site. Badges will include the employee's picture and will be color-coded and dated in order to show that the employee is current with required training.

3. Posters showing pictures of T&E Species with information and protocols to be followed will be placed in conspicuous locations (e.g. construction trailers). Verbiage will be in English and in Spanish.

4. All activities that will result in permanent or temporary ground disturbances shall be preceded by a preconstruction survey conducted by a Designated Biologist(s) or their representative. The biologist(s) shall identify and clearly mark the location of areas where T&E species were identified, and dens or burrows and habitats of T&E Species that are to be avoided. Appropriate buffers will be established with highly visible markers. When burrows or dens are to be damaged, a Designated Biologist will determine when excavation procedures should be employed to protect individual T&E Species, and when it is not necessary. If relocation is permissible, then the appropriate relocation plans will be followed.

5. A Designated Biologist or their representative shall be present while ground-disturbing activities are occurring. In addition to conducting preconstruction surveys, the biologist(s) shall aid crews in satisfying take avoidance criteria and implementing mitigation measures; will document (weekly) all pertinent information concerning Action effects on T&E Species; and shall assist in minimizing the adverse effects of Action activities on T&E Species.

6. Designated Biologists and biological monitors are empowered to order cessation of activities if take avoidance and/or mitigation measures are violated and will notify the applicants environmental representative immediately.

7. Unless Designated Biologist(s) allow alterations to routes, all Action vehicles shall be confined to designated project roads or prominently staked and/or flagged access routes that are surveyed prior to use. All observed T&E Species and their habitat features such as dens, burrows or specific habitats shall be flagged as necessary to alert Project personnel to their presence. All Project-related flagging shall be collected and removed after completion of Project construction.

8. Designated Biologist(s) shall keep an accurate tally of the number of sensitive resources (as listed above) that are damaged or otherwise affected by Action activities. Additionally, biologist(s) shall estimate the number of small mammal burrows damaged or otherwise affected. Total number of dens and burrows affected by the Action shall be reported in the post-activity compliance report and entered into a central database developed expressly for that purpose.

9. PVS shall appoint a company representative who will be the contact source for any employee or contractor who inadvertently kills or injures a T&E Species or who finds a dead, injured, or entrapped T&E Species. The representative will be identified during the pre-performance educational briefing.

10. Any contractor, employee(s), or other personnel who inadvertently kills or injures a T&E Species shall immediately report the incident to their representative. The representative shall contact the Action's environmental representative and Designated Biologist(s). The Action's environmental representative or Designated Biologist will contact CDFW and/or USFWS immediately in the case of a dead, injured, or entrapped listed species. The T&E Species CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. State Dispatch will contact the local warden or biologist. The biologist will also document all circumstances of death, injury or entrapment of T&E Species. The biologist will: 1) take all reasonable steps to enable the individual animal to escape should it be entrapped; 2) contact CDFW, USFWS or other appropriate authorities to identify an approved rehabilitation center and appropriate capture and transport techniques should the covered animal be injured; and 3) document circumstances of death in writing and if possible photograph the dead animal in situ prior to moving (the animal will only be moved with permission from the applicable agencies).

11. If a T&E species is injured or take occurs from a Project-related activities during construction or operations, the Designated Biologist shall be immediately notified and initial notification shall be made to CDFW by calling the Regional Office and providing information on the location, species, number of animals injured or killed, and the Permit Number. Following the initial notification, the Designated Biologist shall prepare written documentation of the information reported by telephone. Permittee shall send CDFW a written report within two calendar days. The report will include the date, time and location of the finding or incident, location of the carcass, and if possible provide a photograph, and any other pertinent information. The CDFW contact information is 1416 9th Street, Sacramento, CA, 95814, and (916) 654-4262. The USFWS contact information is Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, CA 93003.

12. To prevent inadvertent entrapment of T&E Species, all excavated, steep-walled holes or trenches more than two feet deep, or of any depth if they contain water or other material, shall be covered with plywood or other barrier materials or provided with one or more escape ramps constructed of earth fill or wooden planks (wooden planks should be more no less than 10 inches in width and should reach to bottom of trench) at the close of each working day such that animals are unable to enter and become entrapped. Before holes or trenches are filled, a biologist (s) shall inspect them for trapped animals. If any worker discovers that T&E Species have become trapped, construction activities shall cease in the vicinity of the trapped animal and notify the Designated Biologist(s) or their representative immediately. Project workers and the biologist(s) shall allow the T&E Species to escape unimpeded if possible, or the biologist(s) determines that activities are allowed to continue. If an injured T&E Species is discovered at any time, the Designated Representative shall contact the USFWS and CDFW.

13. The Applicant shall employ limitations on pile driving activities to reduce noise levels. These measures include completing pile driving activities in as short a period as feasible; using and operating sonic or vibratory pile drivers at reduced driving force where feasible soil conditions occur instead of impact pile drivers; and if several pile drivers are to be used, the pile driving activities shall be arranged so that no two pile drivers are driving simultaneously within 160 feet of each other.

14. The Applicant is required pursuant to the County's conditions of approval to evaluate and implement feasible foundation installation systems to minimize noise and vibration that would affect ground-dwelling wildlife. Additional noise mitigation measures will be implemented during the construction phase that will reduce potential impacts to nearby wildlife and livestock from loud noises as needed.

15. All spills of hazardous materials shall be cleaned up immediately in accordance with the Applicant Spill Prevention Control Plan.

16. Pets are prohibited at the Action site with the exception of working dogs. Working dogs that assist ranchers are not considered pets. Any working dog entering the Action site will be required to provide proof of inoculations to prevent disease transmission.

17. Firearms are prohibited within the Project Footprint.

18. All food-related trash, such as wrappers, cans, bottles, bags, and food scraps shall be disposed of daily in containers with secure covers and regularly removed from the Action site.

19. Use of rodenticides and herbicides in areas impacted by the Action will be restricted to use within the prescriptions of the Noxious Weed and Invasive Plant Control Plan. Herbicides used for noxious weed control would be applied in accordance with BLM-approved procedures and other federal and state regulations. Applications will be applied by licensed applicators in accordance with label directions and other restrictions mandated by U.S. Environmental Protection Agency, County Agricultural Commissioner, regional label prescriptions on use, California Department of Food and Agriculture, and other state and federal legislation.

20. The width of motorized vehicle movement will be limited to 25 feet during construction activities when driving in occupied T&E Species habitat.

21. Appropriate measures shall be undertaken to prevent unauthorized vehicle entry to off-road survey routes in sensitive habitat areas. Signage will be the preferred method to discourage use.

22. Project vehicles shall be confined to existing roads, construction roads, the perimeter road for the Project Footprint, and transportation corridors between panels. Vehicle travel is not permitted off of designated transportation routes, except in the case of emergency. A day-time speed limit of 15 miles per hour (mph) and a night-time speed limit of 10 mph will be adhered to on the Action site, and Project personnel will not exceed 25 mph on public roads in the vicinity of the Project site.

23. Upon completion of any section, all areas that are significantly disturbed and not necessary for future operations, shall be stabilized to resist erosion, and revegetated and re-contoured if necessary, and will follow goals and methods in the Habitat Restoration and Revegetation Plan to promote restoration of the area to pre-Project conditions.

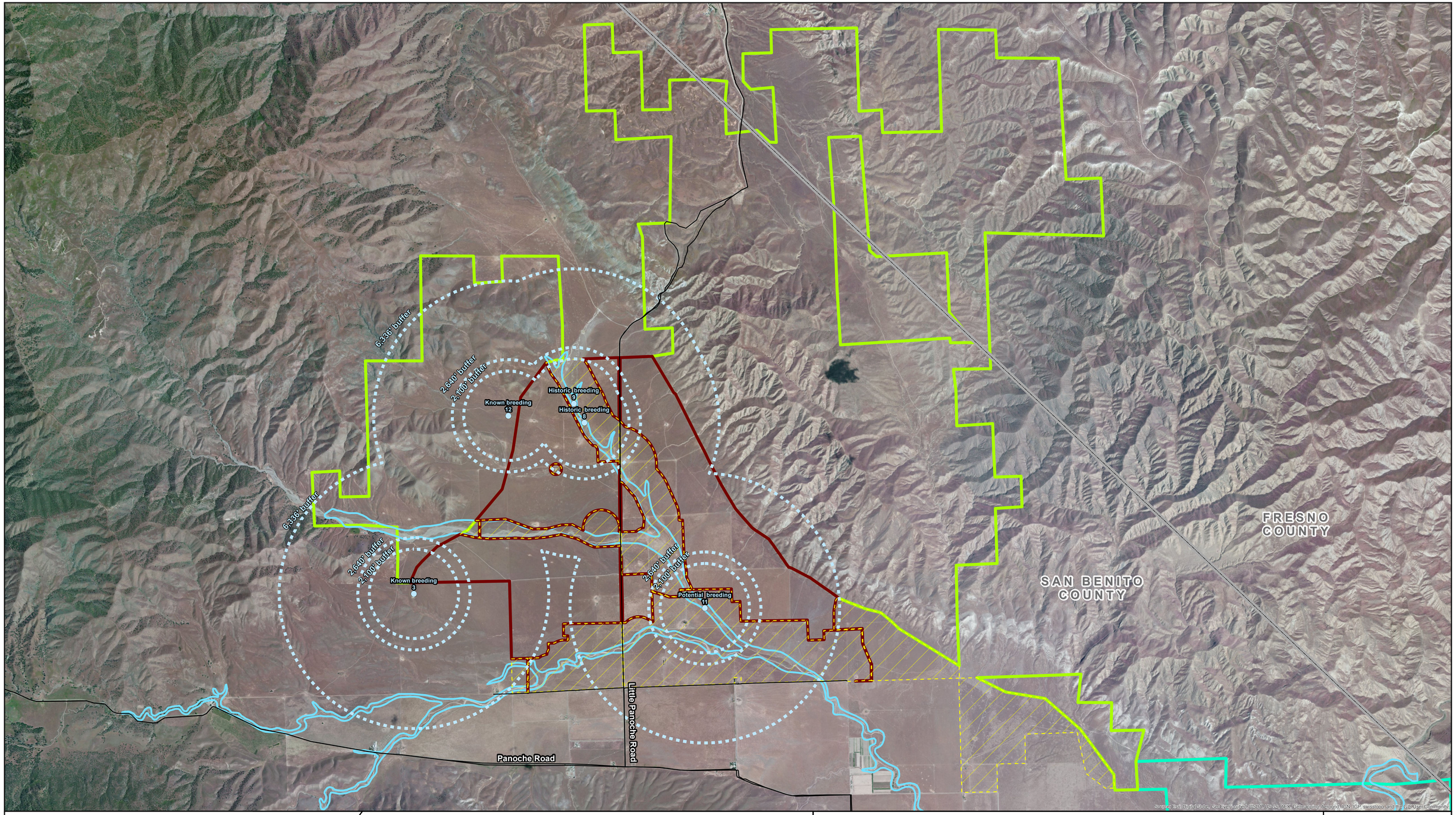
2.4.2 Species-Specific Proposed Avoidance and Minimization Measures

In addition to the general proposed conservation measures described above, the Action will implement species-specific conservation measures for CTS, GKR, SJKF, VPFS, LHFS, CFS, VPTS, and BNLL during construction activities associated with the Action as described below.

California Tiger Salamander

Four known CTS breeding ponds and one potential CTS breeding pond are located within 1.2 miles of the Project Footprint (none are located within the Project Footprint) (**Figure 6**). The objective of these measures is to provide for any CTS found on the Project site to be relocated to a suitable burrow adjacent to the existing breeding pond on the VRCL. Below, and in **Appendix A,** are the measures that will be implemented to protect CTS during construction activities.

a. *CTS Surveys.* The Designated Biologist(s) or their representative shall survey the work site before the Applicant begins any ground disturbing activities. If the Designated Biologist(s) finds any life stages of CTS (adults, eggs, or larvae) the Designated Biologist(s) shall relocate the life form to suitable habitat that is being preserved. The Designated Biologist(s) shall hold the appropriate state and federal Scientific Collecting Permits (SCPs) for amphibians to be authorized to capture and handle CTS. The Designated Biologist(s) may be assisted by approved biologists that do not have SCP; these biologists shall be identified as Designated Monitors.



Energy Renewal PARTNERS, LLC

BR
10/16/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands
- Known CTS Breeding Pond
- CTS Pond Buffer
- 100-year Floodplain

N

0 1,000 2,000 4,000
Feet

Panoche Valley Solar Project

California Tiger Salamander Ponds

Figure
6

b. *CTS Exclusion Fencing.* The Applicant shall place CTS exclusion fencing in focused areas as deemed necessary by the Designated Biologist for any construction activity taking place within 1.2 miles of potential or known CTS breeding sites prior to the rainy season before construction begins and around temporary construction ponds. Prior to the installation of the exclusion fencing, the activity will be preceded by a preconstruction survey conducted by a Designated Biologist or their representative. The Applicant shall maintain the CTS exclusion fencing throughout the first rainy season prior to construction activities and throughout all construction activities. The Applicant shall use wildlife fencing equipped with one-way exits every 250 to 500 feet to avoid entrapment of amphibians inside the fence. The Applicant shall bury fencing to a depth of six inches, and fencing shall be a minimum of 30 inches above grade. CTS exclusion fencing can be designed to work to exclude other species as well. Care should be taken in exclusion fencing design should cattle or sheep be expected to be adjacent to the fencing. Entranceways to construction areas shall be minimized as much as possible and shall be equipped with a gate that can be placed across the entranceway at the end of each working day, which would prevent CTS from entering the site. The Applicant shall avoid small mammal burrows to the extent possible during installation of the exclusion fencing. The exclusion fencing will be removed after the completion of construction or may be removed at the end of the rainy season if the project or section of the project within 1.2 miles of a known or potential breeding pond will be completed prior to the following rainy season.

c. *CTS Relocation Plan.* If a CTS is observed, the permitted Designated Biologist(s) will place the CTS into a suitable bucket or insulated cooler in the shade with a wetted sponge and an ice pack wrapped in a clean cloth (if required) to mimic subterranean conditions. The biologist will then immediately record the biologist's name, date, time, and CTS location using a handheld GPS and digital camera. The sex, age, condition, diagnostic markings, and the general condition and health of each CTS observed will also be recorded and photographed. The CTS will be released into a suitable burrow as close to a suitable pond as possible (most likely Pond #12 on the VRCL; **Figure 6**) and as quickly as possible with a time out of the ground not to exceed one hour. If a dead or injured CTS is located during the burrow excavations or construction activities, the USFWS and CDFW will be contacted immediately and the Applicant and Designated Biologist(s) will follow direction from these agencies for the next steps to take. Finally, the actions undertaken and the habitat description and location of where the CTS were found and where the CTS were relocated will also be recorded and photographed. All of the above information and any field notes will be submitted to the USFWS and the CDFW. In addition, this information will be recorded in a CNDDB report and the Monthly Compliance Report and submitted to the CDFW.

d. *CTS in Project Footprint.* If a CTS is found by any person in areas impacted by the Project Footprint before or during construction activities, the Applicant shall immediately stop all work that could potentially harm the CTS until the permitted Designated Biologist(s) can relocate the CTS to an active rodent burrow system in accordance with the approved relocation plan. Prior to surface disturbance or other covered activity, a qualified wildlife biologist shall conduct a listed species education program (tailgate briefing) for all project personnel who will include an explanation of how to identify CTS, and applicable reporting procedures.

e. *Open Trenches.* All open holes, sumps, and trenches within the areas impacted by the Project will be inspected at the beginning and end of each day for trapped animals during

the rainy season. The Applicant shall provide earthen or wooden (at least 10 inches in width) escape ramps of no more than 3:1 slope every 250 to 500 feet. No more than 5,000 linear feet of trench will be open at one time during the construction.

f. *Rain Forecast.* The Designated Biologist(s) or their representative shall monitor the National Weather Service 72-hour forecast for areas impacted by the Project. A rain gauge shall be installed at the Project site and monitored and refreshed every morning. If rain exceeds 0.25 inches during a 24-hour period, the Applicant shall cease work (including construction-related traffic moving though areas except on public roads) within 1.2 miles of potential or known breeding ponds until no further rain is forecast. In areas within 1.2 miles of potential or known breeding ponds that have been encircled with CTS exclusion fencing (can include structures to permit one-way movement of CTS off the work site), construction may continue during rain events. If work must be completed at night, in the rain, within the exclusion fencing, it will be due to such things as an imminent threat to life, necessary T&E species work, or a significant property and/or construction interest.

g. *Night Work.* The Applicant shall restrict night work in areas within 1.2 miles of potential or known CTS breeding sites when a 70 percent or greater chance of rainfall is predicted within 48 hours of Covered Activities that have not been encircled with exclusion fencing until the chance of rain decreases or no further rain is forecasted. However, even after CTS exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.2 miles of potential or known CTS breeding sites, but outside of the CTS exclusion fencing (e.g., on roads). If work must be completed at night, in the rain, within the exclusion fencing, it will be due to such things as an imminent threat to life, necessary T&E species work, or a significant property and/or construction interest.

h. *Soil Stockpiles.* The Applicant shall ensure that soil stockpiles are placed where soil will not pass into potential CTS breeding pools or into any other "Waters of the State," in accordance with Fish and Game Code 5650. The Applicant shall appropriately protect stockpiles to prevent soil erosion.

i. *Barriers to CTS Movement.* Any roadways that the Applicant needs to construct within 1.2 miles of known or potential CTS breeding sites shall be constructed without steep curbs, berms, or dikes, which could prevent CTS from exiting the roadway. If curbs are necessary for safety and/or surface runoff, the Applicant shall design and construct them to allow CTS to walk over them. If steep dikes are required, the Applicant shall design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow CTS passage.

j. *Fieldwork Code of Practice.* To ensure that disease is not conveyed between work sites, all Biologists shall follow the fieldwork code of practice developed by the Declining Amphibian Populations Task Force Fieldwork Code of Practice; the Designated Biologist(s) may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

k. Breeding Ponds. One to three potential breeding ponds will be created on Conservation Lands depending upon mitigation needs. If possible, the pond(s) will be created without impacts to federal or state waters. However, if the pond(s) cannot be built without

impacting federal or state waters, all necessary permits will be obtained prior to the construction. The Project will be creating new breeding habitat on the Conservation Lands, which will be preserved and managed in perpetuity. Using an adaptive management approach for the Conservation Lands and creation of additional ponds will potentially increase the population in the Panoche Valley by 60 to 180 individual CTS, depending on how many new breeding ponds are created (assumes 60 new breeding adults per pond).

Giant Kangaroo Rat

The GKR avoidance and minimization measures below and in **Appendix B** will be utilized during construction and general operations of the Action.

a. Surveys documenting the presence of GKR in and around the Project Area were used to delineate areas of high GKR occupancy. Several of these areas were removed from the original Project Footprint in order to minimize impacts to GKR. A total of 212 acres of GKR avoidance areas were removed from the (FEIR) Project Footprint and have been incorporated into the VFCL. These areas were selected due to the large numbers of concentrated active and inactive GKR precincts, presence of high quality habitat, and direct connectivity to protected lands.

b. The Project Footprint will include a 20-foot setback from Little Panoche Road based on the number of GKR active and inactive precincts identified along the adjacent fence line.

c. Prior to surface disturbance or other covered activity, a Designated Biologist(s) or their representative shall conduct a listed species education program (tailgate briefing) for all project personnel.

d. Prior to construction activities, a pre-construction survey for GKR will occur in the area of work. If GKR sign is observed within the area of work, GKR will be relocated off-site per the Giant Kangaroo Rat Relocation Plan (**Appendix C**). If exclusion fencing is required, it will be buried deep enough in the ground to prevent GKR from digging under and high enough to prevent them from jumping over. Exclusion fencing will be designed to exclude multiple species if multiple species are present. Special care will be taken in exclusion fence design if cattle or sheep are adjacent to the site. Construction will not commence in an area until it has been completely trapped and excavated and no more GKR are expected to use the area as determined by the Designated Biologist(s). These areas can be fenced and trapped/excavated in smaller sections within the larger Project area. At the end of trapping and excavation, no GKR should remain within the area.

e. All activities that will result in permanent or temporary ground disturbances shall be preceded by a preconstruction survey conducted by a Designated Biologist or their representative. The biologist(s) shall identify and clearly mark the location(s) of areas where GKR was/were identified, and dens, burrows and habitats of GKR.

f. Biological monitors will oversee all construction activities from the first day of work through the duration of construction activities. The Designated Biologist or their representative shall be present at all times during ground disturbing activities immediately adjacent to, or within habitat(s) that supports populations of the listed or special-status species.

g. All GKR burrows (active and inactive) shall be avoided to the extent feasible. Should avoidance not be feasible capture/relocation efforts shall insure that all excavated burrows are unoccupied.

h. Vegetation shall be cleared in the area immediately surrounding active burrows/precincts, followed by a period of one night without further disturbance to allow the GKR to vacate the burrow/precinct.

i. If GKR do not voluntarily leave occupied burrows/precincts, they shall be live trapped prior to commencing ground disturbing activities in the area. If the disturbance is temporary (<1 day) trapped individuals may be held under suitable conditions, during the period of disturbance, and then released at the same location at which they were trapped. For instances where the disturbance is longer term or permanent, individuals will be trapped and relocated to unoccupied burrow precincts, located as nearby as possible in areas that will not be disturbed per the GKR Relocation Plan (**Appendix C**).

j. Methods shall be taken to prevent re-entry to the burrow (e.g., exclusion fencing and one way doors) by GKR (and other small mammal species) until construction is complete in these areas.

k. Once construction activities are complete, access to the burrows shall be restored where possible. If construction related impacts would result in the crushing or destruction of an occupied burrow then the burrow shall be excavated (either by hand or mechanized equipment under the direct supervision of the qualified biologist, removing no more than four inches at a time). GKR burrows/precincts shall not be disturbed from January through June (recognized breeding/mating season) unless a qualified biologist, utilizing video technology, verifies that no young are present in the burrow per the GKR Relocation Plan (**Appendix C**).

l. All captured GKR which are not re-released at the same location as capture will be relocated within 15 miles of the Project Footprint (including possible relocation on unaffected regions of the Project Footprint or Conservation Lands) or other locations determined through further USFWS consultation per the GKR Relocation Plan (**Appendix C**).

m. All open holes, steep-walled holes, or trenches more than two feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks (wooden planks should be 10 inches in width and should reach to bottom of trench, placed at an angle appropriate for GKR to exit).

n. Unless biological monitors allow alterations to routes, all project vehicles shall be confined to existing roads or prominently staked and/or flagged access routes that are surveyed prior to use.

o. Exclusion fencing will be constructed to prevent GKR from entering construction areas.

p. In order to preserve, manage, and maintain the ongoing functionality of the proposed GKR corridors within the VFCL, the Proposed Action shall implement the following measures:

i. The habitat corridors need not be of uniform width, but at no point shall a corridor width be less than 100 feet on either side of the incised channel, or more than 100 feet from the ordinary high water mark where no incised channel is evident.

ii. Habitat corridors shall conform to contours of natural ecological features in the landscape in which the ecological requirements of the species are the foremost consideration.

iii. Habitat corridors shall be fenced in accordance with the Fencing Plan. Fence locations shall be a maximum of 25 feet from edges of all panel installations.

iv. Project design shall incorporate road designation that avoids roads adjacent to the corridors (i.e., there shall be no driving on the side of any panel block adjacent to a designated habitat corridor).

v. New construction of buildings, necessary bridge crossings, ornamental tree plantings, or other features not already identified that would reduce available habitat and may provide perching opportunities for predatory birds shall not be permitted within or directly adjacent to the habitat corridors.

vi. Prior to commencement of construction, habitat corridors shall be placed under a biological conservation easement to be preserved in perpetuity, subject to the following restriction: driving or road building shall be prohibited across habitat corridors except where this provision conflict with the emergency access requirements of the Hollister Fire Department.

San Joaquin Kit Fox

The following mitigation measures will be implemented in order to avoid and minimize adverse impacts to SJKF to the maximum extent practicable:

- Prior to surface disturbance or other covered activity, a Designated Biologist or their representative shall conduct a listed species education program (tailgate briefing) for all project personnel.

- All activities that will result in permanent or temporary ground disturbances shall be preceded by a preconstruction survey conducted by a Designated Biologist or their representative. The biologist(s) shall identify and clearly mark the location(s) of areas where SJKF was/were identified, and dens, and burrows of SJKF.

- A Designated Biologist may determine that a Biological Monitor(s) shall be present while ground disturbing activities are occurring based on the sensitivity of the habitat. Appropriate buffers will be established with highly visible markers. All known or occupied SJKF dens shall be identified by flagging and avoided by a buffer with a radius of 30.5 meters (100 feet).

- All known SJKF natal dens shall be identified by flagging and buffered by a radius of 150 feet.

- All occupied SJKF natal dens shall be identified by flagging and buffered by a radius of 200 feet.

- Potential kit fox dens that cannot be avoided may be excavated and back-filled pursuant to USFWS guidelines (January 2011) without prior notification, provided that excavation is approved and supervised by a biological monitor or other qualified biologist.

- All open holes, steep-walled holes, or trenches more than two feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks (wooden planks should be no less than 10 inches in width and should reach to bottom of trench).

- Construction materials will not be stacked in a manner that allows SJKF to establish den sites within the material. Construction items such as solar panel and equipment transported to the Project on pallets will be placed directly on the ground, and the pallets removed from the site.

- Unless biological monitors allow alterations to routes, all project vehicles shall be confined to existing roads or prominently staked and/or flagged access routes that are surveyed prior to use.

- Speed limits shall be restricted to 15 mph during daylight hours (5:00 am to 9:00 pm) and 10 mph during night-time hours on the site and 25 mph on public roads in the vicinity during both day and night-time driving.

- Signage designed to be both informative and eye-catching will be posted at the boundary of the Project site along Little Panoche Road to alert drivers both to construction traffic and to the presence of special status species on the site, and will include a posted speed limit.

An unimpeded north-south corridor will be protected with no disturbance (with the exception of the existing road, emergency access crossing, and the planned project perimeter road), during project construction and operations and maintenance. Below, and in **Appendix D,** are the measures that have been implemented to provide SJKF additional movement corridors through the project:

a. A 500 meter (1,640.4 feet) wide and approximately 2,484 meter (8,000 linear feet) long corridor associated with the existing Las Aquilas Creek /VFCL corridor have been included in the Project and will be beneficial in providing additional undisturbed connectivity. The corridor will promote movement through the site and north to the Panoche Hills and BLM landholdings. The undisturbed VFCL along Las Aquilas Creek will be widened to accommodate this SJKF enhancement.

b. The Panoche Creek Corridor and associated VFCL intersects the southern portion of the VFCL in a west to southeast direction. This corridor provides connectivity to the large block and high quality habitats (e.g., grassland flats) to the west of the project including the Gabilan Range and eventually through to the SCRCL and the BLM lands beyond. The southern portion of the VFCL also provides unimpeded west to east travel ways from the Panoche Creek wash (and adjacent flats) to the VRCL and adjacent Tumey Hills/Panoche Hills BLM landholdings including the Las Aquilas Creek drainage.

c. Moss-Panoche 230kV Transmission Line Corridor - bisecting the southwestern portion of the project footprint and associated VFCL in a northwest to southeast direction. This 22.48 meter (75 feet) corridor provides connectivity to the habitats (e.g., grassland flats, Panoche Creek wash) to the west of the project including the Gabilan Range and eventually through to SCRCL and adjacent BLM landholdings.

Additional SJKF avoidance and minimization measures will be utilized during construction, and general operations of the Action are described below and in **Appendix D**.

a. Prior to construction activities, pre-construction surveys shall occur and any potential SJKF den (burrow size of four inches or larger) shall be avoided from direct impact. A biologist(s) shall monitor the SJKF den during construction activities, and the den should be avoided by construction personnel. If a road is to be installed near a den, speed limits of 10 mph will be implemented near the den. Construction materials will be stored in a manner as to minimize the potential for SJKF to use the material for a den.

b. SJKF permeable perimeter fencing will be constructed to allow SJKF movement through the Project Footprint. A 12.7 to 15.2 centimeter (cm) (5 to 6 inch) gap along the bottom of the chain linked fence would allow SJKF to travel through the site and link up with the existing travel corridors, including the creek washes and the VFCL, as well as link up prey base areas such as the GKR precinct/colony avoidance areas. A fencing option to the chain linked fence would be an inverted "deer" fence that would have larger rectangular openings on the bottom that would allow the SJKF to pass through. These fencing designs were either previously approved or suggested by the CDFW and USFWS for other solar projects. Fences surrounding the substation and O&M building will be constructed to restrict SJKF access.

c. If avoidance of known dens is not possible, PVS will take the following sequential steps when working in such areas:

    1. Allow for three consecutive days of monitoring to determine the occupancy status of each den. Activity at the den shall be monitored by using tracking medium at the entrance to the den and/or stationary infrared beam cameras, and by spotlighting. If no activity is observed, actions described below under Step 3 may be implemented. If SJKF activity is observed, the den shall be monitored for an additional five days from the date of observance. Use of the den during this time can be discouraged by partially plugging its entrance(s) with soil in such a manner that any resident animal can escape easily. If SJKF are still present after five days, den excavation, discussed below under Step 3 may proceed when, in the judgment of the qualified/approved biologist, it is determined temporarily vacant.

    2. Once the SJKF has vacated the den, methods (e.g., one way doors) shall be taken to prevent reentry to the burrow by SJKF (and other mammal species) until construction is complete in these areas. Once construction activities are complete access to the burrows shall be restored.

    3. Once it has been confirmed that the dens have been vacated, if construction related impacts would result in the crushing or destruction of a den, the den shall be excavated. Excavation shall be done only by hand and under the direct supervision of a biologist, removing no more than four inches at a time. If at any time during excavation a SJKF is discovered inside the den, all activity will cease immediately, and monitoring described above under Step 1 (above) shall be resumed. As indicated above, natal dens shall not be disturbed at any time.

d. Potential SJKF dens that cannot be avoided will be excavated and back-filled pursuant to USFWS guidelines (USFWS 2011) without prior notification, provided that excavation is

approved and supervised by a biological monitor or the Designated Biologist(s). Destruction of all SJKF dens shall be reported in the post-activity compliance report.

e. Trapping of SJKF will be completed to collar individual SJKF captured for location monitoring during construction activities by the Designated Biologist or Biological Monitors. The daily telemetry location of the SJKF will be used as an impact avoidance measure.

Vernal Pool Fairy Shrimp, Conservancy Fairy Shrimp, Longhorn Fairy Shrimp, and Vernal Pool Tadpole Shrimp

One vernal pool and one hydrologically connected vernal pool on the site are occupied by VPFS. Prior to construction activities, BMPs (such as use of silt fencing, hay bales, etc.) outlined in the site-specific Stormwater Pollution Prevention Plan, will be implemented to limit erosion and sediments from entering vernal pool habitat. Additionally, a 100-ft buffer will be placed around all occupied vernal pools to prevent equipment from inadvertently entering these pools. Additional Project avoidance and minimization measures for the VPFS are located in **Appendix A**.

Blunt-nosed Leopard Lizard

The avoidance and minimization measures, noted below and in **Appendix E,** are intended to avoid take of individual BNLL during construction and general operations of the Action. All Project personnel and contractors working on the Project will implement these measures.

a. Prior to initiation of ground disturbing activities, a Designated Biologist(s) shall conduct a BNLL education program (e.g., tailgate briefing) for all Project personnel. Topics to be discussed during the briefing shall include: occurrence and distribution of BNLL in the Project area, take avoidance measures being implemented during the Project, reporting requirements if an incident occurs, applicable definitions and prohibitions under the Fish and Game Code for fully protected species, and relevant provisions of the federal and state Endangered Species Act.

b. A full-protocol survey has been completed on the entire Project Footprint. In addition to the full-protocol survey that was completed, abbreviated surveys were completed in areas of primary habitat at various times since 2009. All activities that will result in permanent or temporary ground disturbances shall be preceded by a pre-construction survey within 30 days of construction by a Designated Biologist(s). In addition, an additional pre-construction survey immediately prior to the onset of construction will be conducted. The biologist(s) shall identify and clearly mark the location of areas where any BNLL were observed. If a BNLL is observed on the Project Footprint, CDFW and USFWS will be contacted. For information on the rational for the buffer, see **Appendix E**.

c. In potential higher BNLL impact risk areas, in the vicinity of Las Aquilas Creek (i.e., within Township 15S, Range 10E, Section 9 and 16), enhanced pre-construction surveys for adult BNLL will be conducted. These enhanced surveys will consist of focused protocol BNLL surveys in the month of May preceding the ground disturbance. The survey methodology will be generally based on the CDFW Approved Survey Methodology for the Blunt-nosed Leopard Lizard (CDFG 2004).

d. A biological monitor(s) shall be present while ground disturbing activities are occurring. In addition to conducting preconstruction surveys, the biological monitors shall aid crews

in satisfying take avoidance criteria for BNLL and implementing Project avoidance and mitigation measures. Biological monitors shall accompany vehicles and crews throughout the Project area if the Designated Biologist considers it necessary in order to avoid individual BNLL. Biological monitors are empowered to order cessation of activities if an immediate threat of "take" is identified or take avoidance and/or mitigation measures are violated or a BNLL is located within the construction area and will notify the project environmental representative.

e. All construction work and equipment use (except for driving) shall occur within exclusion zones of no greater than 100 acres in extent. Multiple 100-acre exclusion zones are allowed, but shall not exceed 613 acres in total extent at any one time.

f. Unless Designated Biologist(s) allow alterations to routes, all Project vehicles shall be confined to defined access routes that will be staked and/or flagged. All observed BNLL shall be avoided by a flagged 52.4-acre buffer to alert Project personnel to their presence. All Project-related flagging shall be collected and removed after completion of the Project.

g. The creation of the 2,523 acre VFCL will provide permanent protection to the BNLL and associated high quality wash and terrace habitat. Almost all observations of BNLL on the Project have been observed on the VFCL. No BNLL observations have been made on the Project Footprint.

h. The Applicant shall appoint a representative who will be the contact source for any employee or contractor who inadvertently kills or injures a BNLL or who finds a dead, injured, or entrapped individual BNLL. The representative will be identified during the pre-performance educational briefing.

i. Any contractor, employee(s), or other personnel who inadvertently kills or injures a BNLL shall immediately report the incident to their representative. The representative shall contact the Applicant's environmental representative and the Designated Biologist(s). The Applicant will contact CDFW and USFWS immediately in the case of a dead, injured, or entrapped BNLL. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. State Dispatch will contact the local warden or biologist. The USFWS contact for immediate assistance is (805) 644-1766. The Designated Biologist(s) will document all circumstances of death, injury or entrapment of BNLL. The biologist will: 1) take all reasonable steps to enable the individual animal to escape should it be entrapped; 2) contact CDFW, USFWS, or other appropriate authorities to identify an approved rehabilitation center and appropriate capture and transport techniques should the covered animal be injured; and 3) document circumstances of death in writing and, if possible, photographing dead animal *in situ*. Notification shall include the date, time, and location of the incident or of the finding of a dead or injured BNLL, and any other pertinent information. The USFWS contact for this information is the Endangered Species, Program Field Office, 2493 Portola Rd., Suite B, Ventura, CA 93003. The dead Covered animal can be transported to California State University at Bakersfield or the Endangered Species Recovery Team in Bakersfield for storage and research if CDFW and USFWS approve.

j. To prevent inadvertent entrapment of BNLL, all open holes, steep-walled holes, or trenches more than two feet deep shall be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of

earth fill or wooden planks (wooden planks should be no less than 10 inches in width and should reach to bottom of trench). Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals.

k. Motorized vehicles are prohibited within occupied BNLL habitat (defined as 52.4-acre buffer surrounding all observations).

2.4.3 Operations and Maintenance Proposed Avoidance and Minimization Measures

The avoidance and minimization measures described below will be implemented during operations and maintenance of the solar facility throughout its operation.

1. All Project vehicles shall be confined to existing roads, Project perimeter roads (excluding wash crossings, which are restricted to emergency use only), transportation corridors between panels, or prominently staked and/or flagged access routes.

2. The Action shall appoint a company representative who will be the contact source for any employee or contractor who inadvertently kills or injures a T&E Species or who finds a dead, injured, or entrapped T&E Species.

3. Any contractor, employee(s), or other personnel who inadvertently kills or injures a T&E Species shall immediately report the incident to their representative. The representative shall contact the Project's environmental representative and, if feasible, a Designated Biologist(s). The Project's environmental representative will contact CDFW and USFWS immediately in the case of a dead, injured, or entrapped listed species. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. State Dispatch will contact the local warden or biologist. The USFWS contact for immediate assistance is (805) 644-1766. The Designated Biologist(s) will also document all circumstances of death, injury or entrapment of T&E Species. The biologist will: 1) take all reasonable steps to enable the individual animal to escape should it be entrapped; 2) contact CDFW, USFSW, or other appropriate authorities to identify an approved rehabilitation center and appropriate capture and transport techniques should the covered animal be injured; and/or 3) document circumstances of death in writing and if possible photographing dead animal in situ.

4. CDFW and USFWS shall be notified in writing within two working days in the event of an accidental death or injury of a T&E Species or of the finding of any dead or injured T&E Species. Notification shall include the date, time, and location of the incident or of the finding of a dead or injured animal, and any other pertinent information. The CDFW contact information is 1416 9th Street, Sacramento, CA, 95814, and (916) 654-4262. The USFWS contact information is: the Endangered Species, Program Field Office, 2493 Portola Rd., Suite B, Ventura, CA 93003.

5. All spills of hazardous materials shall be cleaned up immediately in accordance with the Applicant's Spill Prevention Control Plan.

6. Pets are prohibited at the Action site with the exception of working dogs. Working dogs that assist ranchers are not considered pets. Any working dog that will be entering the Action site will have to show proof of inoculations to prevent disease transmission to SJKF.

7. Firearms are prohibited at the Project Footprint.

8. All food-related trash, such as wrappers, cans, bottles, bags, and food scraps shall be disposed of daily in containers with secure covers and regularly removed from the site.

9. Use of rodenticides and herbicides in areas impacted by the Action will be restricted to use within the Noxious Weed and Invasive Plant Control Plan. Applications will be applied by licensed applicators in accordance with label directions and other restrictions mandated by U.S. Environmental Protection Agency, County Agricultural Commissioner, regional label prescriptions on use, California Department of Food and Agriculture, and other state and federal legislation/regulation.

10. Appropriate measures shall be undertaken to prevent unauthorized vehicle entry to off-road survey routes in sensitive habitat areas. Signage will be the preferred method to discourage use.

11. A day-time speed limit of 15 mph and a night-time speed limit of 10 mph will be adhered to on the Project site, and vehicles will not exceed 25 mph on public roads in the vicinity of the Project site.

2.4.4 Conservation Lands

In addition to the avoidance and minimization measures described above, the Action will also implement a conservation package consisting of the permanent preservation and management of three large parcels of land to offset potential impacts. These lands are the VFCL, VRCL, and SCRCL. These lands will be enhanced and managed for the species through implementation of the Conservation Management Plan (**Appendix F**). The lands were selected to provide local mitigation, preserve core populations and create permanent movement corridors with adjacent BLM controlled lands.

The FEIR established certain mitigation ratios for CEQA purposes, which vary by species, to compensate for impacts to species and habitats. These FEIR measures are as follows:

- Suitable BNLL habitat permanently directly impacted by the Action will be mitigated at a 3:1 acreage ratio. Suitable BNLL habitat indirectly impacted by the Action will be mitigated at a 2:1 acreage ratio.

- Suitable SJKF habitat permanently impacted by the Action will be mitigated at a 4:1 acreage ratio by conservation lands. This 4:1 ratio will be broken down into high and moderate suitability habitat. A 2:1 acreage ratio will consist of high suitability habitat, and another 2:1 acreage ratio will consist of moderate suitability habitat.

- Suitable GKR habitat permanently impacted by the Action will be mitigated at a 3:1 acreage ratio.

- CTS suitable breeding habitats and suitable upland habitat impacted within 2,100 feet of a known or potential breeding pond will be mitigated at a 3:1 acreage ratio, suitable upland habitat located between 2,100 feet and 2,640 feet (0.5 mile) of a breeding pond will be mitigated at a 2:1 acreage ratio, and suitable upland habitat located between 2,640 feet and 6,636 feet (1.2 miles) of a breeding pond will be mitigated at a 1:1 acreage ratio. Temporary impacts will be mitigated at a 0.5:1 acreage ratio. Preserved habitat shall be the same quality or better quality than the habitat disturbed.

- To the extent that the fill or disturbance of ephemeral pools occupied by special-status fairy shrimp species, which may be identified at a later date, cannot be avoided, as required by the

FEIR, each acre or fraction thereof of occupied vernal pool habitat which is filled or disturbed shall be compensated by the preservation and management of two acres of occupied VPFS habitat (2:1 preservation ratio) and the creation, management, and preservation of one acre of vernal pool habitat (1:1 creation ratio) at a location approved and pursuant to authorization received from the USFWS. The applicant may also satisfy this mitigation requirement through the purchase of credits at a USFWS-approved mitigation bank.

In order to implement the mitigation measures prescribed by the FEIR and to address the species and habitat impact and mitigation concerns expressed by USFWS and CDFW, the Action includes the permanent preservation and management of approximately 24,185 acres of conservation lands, as follows:

Valley Floor Conservation Lands (approximately 2,523 acres)

In order to avoid detrimental effects to T&E species, particularly BNLL, SJKF, and GKR and their habitats, the Applicant adjusted and reduced the Project Footprint by greater than 75 percent to avoid the most suitable habitat for these species and committed to permanently preserve the highly suitable habitat as the VFCLs. The VFCLs are contiguous with the Project Footprint and are primarily non-native annual grassland habitat, with some seasonal ponds and vernal and ephemeral pools, as well as segments of seasonally dry Panoche and Las Aquilas Creeks. A full description of the biotic habitats of the Action Area is provided in **Section 3.2**. The VFCLs include the entire 100-year floodplain within the previously larger Project area boundary on the valley floor, as well as the additional SJKF movement corridor, GKR avoidance areas, and BNLL avoidance buffers. These lands are currently grazed, which enhances the habitat for the T&E Species, and will continue to be grazed under adaptive management detailed in the Conservation Management Plan (**Appendix F**).

The VFCLs are contiguous with the Project site. These lands include several seasonal drainages and all of Panoche Creek that lies within the Project area boundary, which is usually a deep-cut dry wash for most of the year, as well as the 100-year floodplain that bisects the Project site in two places, which provides corridors or landscape linkages for all of the T&E Species across the valley floor. Both portions of these lands are comprised of non-native annual grassland habitat and slopes less than 11 percent. **Figure 3** shows the location of the Valley Floor Conservation Lands.

Valadeao Ranch Conservation Lands (approximately 10,772 acres)

Based upon initial biological surveys of the Project site and discussions with CDFW and USFWS, PVS identified and acquired rights to permanently preserve and manage the adjacent Valadeao Ranch property, which is located north, east, and west of the Project site (**Figure 3**).

The VRCL are contiguous with the Project Footprint directly to the west, east, and northeast of the site. These lands are also contiguous with the Valley Floor and SCRCL. VRCL include several seasonal drainages. The property is dominated by introduced annual grasslands (approximately 6,700 acres) and ephedra shrubland (approximately 2,700 acres), and also supports atriplex shrubland, and juniper and oak woodlands. A full description of the biotic habitats of the Action and associated Conservation Lands is provided in **Section 3.2**. Soils on this site are complex and range from sandy to sandy loam to clay loam to badlands. The VRCL contain approximately 2,945 acres with slopes between 0 and 11 percent (preferred slopes for several of the T&E species discussed in this document). Elevations on the Valadeao Ranch range from approximately 1,400 feet to 2,100 feet above mean sea level (amsl). These lands are currently grazed, which enhances the habitat for the T&E Species, and will continue to be grazed under adaptive management detailed in the Conservation Management Plan (**Appendix F**).

T&E species observed (either directly or by their sign) on the VRCL include CTS, GKR, and SJKF. Portions of the VRCL were found to be suitable for BNLL, GKR, CTS, and SJKF in differing acreage amounts. The VRCL also support one known CTS breeding pond and estivation habitat for an additional known CTS breeding pond located on private land. This breeding pond and estivation habitat for both ponds will be preserved in perpetuity and will increase the mitigation value for CTS.

Silver Creek Ranch Conservation Lands (approximately 10,890 acres)

During the DEIR public comment period, the Applicant consulted with the County, CDFW, USFWS, and various experts on the T&E Species regarding additional possible mitigation for unavoidable impacts to sensitive biological resources. PVS then identified and secured the rights to permanently preserve and manage additional conservation lands in the Panoche Valley known as the Silver Creek Ranch.

The SCRCL are southeast of the Project Footprint (**Figure 3**). The northwestern-most corner of the SCRCL is contiguous with a portion of the VRCL. Elevations on the SCRCL range from 900 to 2,200 feet amsl. California annual grasslands comprise the majority of ground cover on the site (approximately 8,400 acres) and are dominated by non-native species distributed sparsely over the landscape; the site also supports ephedra shrubland (approximately 2,260 acres), riparian areas, seeps, springs, and barrens. An area of tamarisk shrubland occurs along Silver Creek, and small areas of emergent wetlands and marsh occur along Panoche Creek. These lands include several seasonal drainages and upland habitat as well. A full description of the biotic habitats of the Action and associated Conservation Lands is provided in **Section 3.2**. Soils on the Silver Creek Ranch are less complex than those found on the Valadeao Ranch and are generally characterized as well drained and moderately permeable. Silver Creek Ranch contains approximately 5,765 acres with slopes between 0 and 11 percent. These lands are currently grazed, which enhances the habitat for the T&E Species, and will continue to be grazed under adaptive management detailed in the Conservation Management Plan (**Appendix F**).

The Silver Creek Ranch is specifically identified in the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) and the *Recovery Plan 5-year Reviews* (USFWS 2010a, 2010b, 2010c), as an area with high habitat value for the T&E Species. The Recovery Plan also identifies the BLM's program of acquisition in which the Silver Creek Ranch is one of the two main ranches targeted for purchase. The Recovery Plan, in reference to GKR, also has a goal to "protect all existing natural land on the Silver Creek Ranch…" (Page 95). In reference to BNLL, the Recovery Plan aims to "Protect additional habitat for them in key portions of their range; areas of highest priority to target for protection are: …Natural lands in the Panoche Valley area of Silver Creek Ranch, San Benito County" (Page 122). By preserving the SCRCL, the Action will preserve a "highest priority" area identified in the Recovery Plan for these listed species that is currently unprotected.

T&E Species observed (either directly or by their sign) on the SCRCL include GKR, BNLL, and SJKF. While no CTS have been observed on the SCRCL, no protocol level CTS surveys have taken place to date on this property. Dr. Mark Jennings, a noted California herpetologist, did identify several ephemeral ponds on the SCRCL that would serve as suitable CTS breeding habitat.

Additional information regarding the SCRCL can be found in **Appendix G**.

2.4.5 Conservation Package

All Conservation Lands described above will be protected from future development in perpetuity. **Appendix F** presents a full Conservation Management Plan for the Action. This Conservation Management Plan will utilize adaptive management techniques to support enhancement, management, and preservation of all Conservation Lands. As a frame of reference, the USFWS Five Point Policy for

Habitat Conservation Plan (HCPs; USFWS 2000) states that adaptive management is defined as a method for examining alternative strategies for meeting measurable biological goals and objectives, and then if necessary, adjusting future conservation management actions according to what is learned. Annual monitoring of relative abundance of targeted species populations, prey species, vegetation characteristics associated with GKR colonies and small mammals, and results from the ongoing monitoring will serve to evaluate the effectiveness of ongoing management including specifics related to grazing (e.g., timing and extent).

In addition to the Conservation Management Plan, the Project will also prepare and implement the following in conjunction with the operations of the facility and the management of the conservation lands:

- Bird and Bat Conservation Strategy
- Eagle Conservation Plan
- Grazing Plan
- Worker Environmental Education Program
- Fugitive Dust Mitigation Plan
- Habitat Restoration and Revegetation Plan
- Habitat Mitigation and Monitoring Plan
- Noxious Weed Control Plan
- Comprehensive Fencing Plan
- Traffic Control Plan
- Groundwater Reporting and Monitoring Plan
- Spill Prevention, Control, and Countermeasure Plan
- Lighting Mitigation Plan

Two sets of plans and strategies will be developed as needed for the Project. One set that will cover the construction of the Project Footprint, and the other will cover the management of the Conservation Lands.

Enhancement

Although much of the Conservation Lands already support high quality habitat for the T&E Species, there are opportunities to enhance these lands to increase the quality of habitat, thus increasing the carrying capacity for T&E species resulting in a net conservation benefit. For example, *Tamarix* sp., a highly invasive plant species that attacks riparian systems, occurs on portions of the SCRCL. *Tamarix* sp. can actually change the hydrology of riparian systems (lowering the amount of water available to native species) and increase the amount of salt in the system. Within an adaptive management framework through the implementation of the Conservation Management Plan (**Appendix F**), an eradication program will be put in place to remove tamarisk from SCRCL. This will eliminate the further infiltration of tamarisk and will also result in the ability of native plants (such as cottonwoods and willows) to re-establish within the riparian system, thereby increasing the biotic value of this natural resource. In addition, should T&E Species monitoring indicate that feral pig habitat damage is negatively affecting directly or through habitat impacts on the Conservation Lands, the CDFW will be consulted to establish feral pig control measures on candidate Conservation Lands. Any such program will be subject to all take avoidance and minimization measures and any additional measures deemed necessary to adequately protect T&E Species (e.g., timing, general location of activities, etc.).

Some areas along creeks and natural drainages within the conservation areas are experiencing erosion due to heavy grazing, which is adding to the siltation of these features. Through an adaptive management program through the implementation of the Conservation Management Plan (**Appendix F**), grazing ungulates will be strategically kept out of these areas, and when appropriate, native vegetation will be

planted to enhance these natural features, increasing the biotic value for local species. In addition, heavy grazing regimes will be altered (e.g. temporary exclusion of livestock) to allow areas that are over-grazed to regenerate through the implementation of the Conservation Management Plan (**Appendix F**). This will increase food supplies and cover for insects, reptiles, birds, and mammals, which will aid in increasing the population of GKR and, in turn, increase the SJKF population.

Due to the number of naturally occurring drainages and swales on the Conservation Lands, there are opportunities to create pools, offering potential breeding habitat for CTS. There is plentiful upland estivation habitat available for CTS throughout the Conservation Lands, and the addition of breeding ponds would increase the potential carrying capacity for the species in the region. Please see **Appendix H**, CTS Mitigation Plan for locations of a potential breeding pond sites. One pond is to be installed on the VRCL in close proximity to the known breeding pond (**Figure 6**). This would create a breeding pond complex and potentially promote genetic diversity through more breeding pond options. Although CTS were not surveyed for on the SCRCL, one option for CTS mitigation will include the installation of a breeding pond on these properties, if future surveys identify CTS on-site. If possible, the pond(s) will be created without impacts to federal or state waters. However, if the pond(s) cannot be built without impacting federal or state waters, all necessary permits will be obtained prior to the construction.

Management

All Conservation Lands are currently grazed with no consideration to maintaining the suitability of the sites for the T&E Species. These species persist in spite of the current grazing regime. Observational data for these species indicate that they generally prefer short grass conditions, with very limited experimental evidence supporting a specific grazing regime (i.e., timing or intensity).

Therefore, the Conservation Management Plan (**Appendix F**) and the Grazing Plan will manage future grazing on the Conservation Lands to benefit T&E Species. The Conservation Management Plan and Grazing Plan will, through conservation goals and objectives, manage the future livestock grazing in accordance with grazing standards and guidelines maintained by the BLM or agency approved habitat management (under a mutual understanding between CDFW and USFWS), as long as they benefit the T&E Species found on the Conservation Lands. The conservation goals and objectives found in the Conservation Management Plan (**Appendix F**) provide direction in habitat management in order to meet conservation goals. BLM grazing standards include erosion control; maintenance of vigorous, diverse native and other desirable plants; stream channel stabilization; and maintenance of state water quality standards. Grazing will be based on an adaptive management strategy that benefits T&E Species and that has been defined as an integrated method for addressing uncertainty in natural resource management (Federal Register 2000; Holling 1978; Walters 1986; Gundersen 1999).

Moderate to heavy stocking rates have been found to benefit all of the T&E Species during appropriate rainfall years (Barry 2011; Germano et al. 2011). The current grazing regime on the SCRCL is moderate to high stocking rates. These stocking rates currently are maintaining habitat required for T&E Species on the SCRCL, as shown by the number and density T&E Species on the property. This grazing regime on SCRCL should continue with some adaptive habitat management as long as it is beneficial for the T&E Species.

3.0 ACTION AREA

For the purpose of this BA, the Action Area will be defined as lands impacted by the Project Footprint (meaning the area within the fenceline of the solar project), as well as all Conservation Lands to be preserved by the Action (**Figure 3**).

3.1 Data Collection/Survey Methods

PVS has completed over 25,000 survey hours for multiple T&E Species, rare plants, wetlands delineation, and hydrological studies of Panoche Creek and Las Aquilas Creek. Surveys have occurred on the Project Footprint, the VFCL, VRCL, and SCRCL. **Table 8** presents a summary of all surveys completed for the Action.

TABLE 8 SURVEYS CONDUCTED FOR THE PROJECT

SURVEY NAME	SURVEY DESCRIPTION	DATES	LANDS SURVEYED	SPECIAL STATUS ANIMAL SPECIES DETECTED
RECONNAISSANCE SURVEYS				
Reconnaissance survey of original 10,000-acre Project site and additional 900-acre Project site with some restricted access at the time of the survey	Reconnaissance survey (walking/driving surveys for potential habitat for special status species)	April 1-3, 2009	Project Footprint and VFCL	Burrowing owl (BUOW), loggerhead shrike, tri-colored blackbird, GKR, SJKF
Reconnaissance surveys	Reconnaissance surveys (walking surveys for special status species)	April-July 2010	VRCL	GKR, SJKF, American badger (AMBA), golden eagle (GOEA)
Non-protocol reconnaissance Brachiopod surveys	A one-day effort to survey for Brachiopods in seven pools	April 14, 2010	Seven off-site ponds on VRCL and private property	VPFS and CTS
Reconnaissance surveys on the Silver Creek Ranch	Reconnaissance surveys (walking surveys for special status species, suitable habitat for these species, and spotlight surveys for SJKF)	August 30 - September 3, 2010	SCRCL	BNLL, loggerhead shrike, Mastiff bat, GKR, SJKF, San Joaquin antelope squirrel (SJAS), AMBA

SURVEY NAME	SURVEY DESCRIPTION	DATES	LANDS SURVEYED	SPECIAL STATUS ANIMAL SPECIES DETECTED
BNLL SURVEYS				
Blunt-nosed Leopard Lizard (BNLL) Abridged Protocol Survey (2009)*	Protocol-level BNLL surveys on 2,560+ acres: 3.5 full-coverage Adult BNLL on Section 15; 8 full-coverage Adult BNLL on Section 10; 5 full-coverage juvenile BNLL surveys on Sections 10 and 15; BNLL surveys on part of Section 9.	Summer 2009 (April 15 – July 31 and August 15 – September 15)	Project Footprint and VFCL	BNLL, San Joaquin coachwhip, GOEA, BUOW, loggerhead shrike, SJAS, GKR, SJKF, AMBA
Blunt-nosed Leopard Lizard Protocol Survey (2010)	Protocol-level BNLL surveys on 640 acres: Full adult and juvenile BNLL surveys on Section 16.	Summer 2010 (April 15 – July 31 and August 15 – September 15)	Project Footprint and VFCL	BNLL, San Joaquin coachwhip, GOEA, loggerhead shrike, GKR, SJKF, AMBA
Blunt-nosed Leopard Lizard Focused Survey (2012)	Focused BNLL surveys on the 10,889-acre Silver Creek Ranch, following time of day and weather protocols, targeting drainages.	Summer 2012 (September 10-17, 2012)	SCRCL	BNLL, GKR, SJAS, SJKF, AMBA, GOEA, BUOW, western pond turtle
Blunt-nosed Leopard Lizard Protocol Survey (2013)	Protocol-level BNLL surveys on the entire Project Footprint and portions of the Valley Floor CL	Spring and Summer 2013	Project Footprint, portions of VFCL	BNLL, GOEA, BUOW, GKR
VERNAL POOL SURVEYS				
Wet Season Protocol-level vernal pool branchiopod surveys	Protocol-level vernal pool branchiopod surveys	Began in December 21, 2009, and continued in 2010 on January 4, 5, 18, and 19; February 1, 2, 16, and 17; March 2, 3, 16, 17, and 30; April 13, 14, 27, and 28; May 11 and 25; and June 7.	Project Footprint, VFCL, and VRCL	VPFS, CTS, and SJAS

SURVEY NAME	SURVEY DESCRIPTION	DATES	LANDS SURVEYED	SPECIAL STATUS ANIMAL SPECIES DETECTED
Dry Season Protocol-level vernal pool branchiopod surveys	Protocol-level vernal pool branchiopod surveys	September 27-30, 2010	Project Footprint, VFCL, and VRCL	VPFS
CTS SURVEYS				
Evaluation of historical breeding ponds identified in 1992 in the CNDDB	Evaluation of suitability of ponds in Section 4 to support CTS, resulting in confirmation of suitable breeding habitat	April 10, 2009	VFCL	
Protocol CTS Larval Sampling I	Protocol CTS Larval Surveys	March 23-26, 2010	Project Footprint, VFCL, and VRCL	CTS
Protocol CTS Larval Sampling II	Protocol CTS Larval Surveys	April 13, 14, and 21, 2010	Project Footprint, VFCL, and VRCL	CTS
Protocol CTS Larval Sampling III	Protocol CTS Larval Surveys	May 21, 2010	Project Footprint, VFCL, and VRCL	CTS
Hydrology and CTS Reconnaissance Survey	Identify locations to construct new CTS ponds	June 28, 2012	VRCL and SCRCL	GKR, SJKF
RARE PLANT SURVEYS				
Rare Plant I (Late Summer/Early Fall)	Protocol-level rare plant surveys on all or portions of Sections 3-5, 7-11, 13-17 of Township 15 South, Range10 East and Sections 18 and 19 of Township 15 South, Range 11 East; 6,200 acres of the original 10,000-acre Project site	August17-19, 24-26; September 14-18, 21-25; and September 30-October 2, 2009	Project Footprint and VFCL	BNLL, GKR, SJKF, AMBA

SURVEY NAME	SURVEY DESCRIPTION	DATES	LANDS SURVEYED	SPECIAL STATUS ANIMAL SPECIES DETECTED
Rare Plant II (Early Spring)	Protocol-level rare plant surveys on all or portions of Sections 3-5, 8-11, 13-16, of Township 15 South, Range 10 East, and Section 19 of Township 15 South, Range 11 East	March 8-April 9, 2010	Project Footprint and VFCL	GKR, SJKF, AMBA
Rare Plant III (Late Spring)	Protocol-level rare plant surveys on all or portions of Sections 3-5, 8-11, 13-16, of Township 15 South, Range 10 East, and Section 19 of Township 15 South, Range 11 East	May 4-June 4, 2010	Project Footprint and VFCL	GKR, SJKF, AMBA
Follow-up Rare Plant Survey	To determine the species of 28 *Blepharizonia* populations that were found to be occurring in pre-flowering phenology during the May-June 2010 transect surveys	July 26-27, 2010		
WETLANDS DELINEATION				
Wetland Delineation (POWER Engineers)	Full wetland delineation of the Project site and Valley Floor CL	October 19-23, 2009	Project Footprint and VFCL	
SJKF SURVEYS				
Scat-sniffing dog	Scat-sniffing dog: describe transects	July 30-August 16, 2010	Project Footprint, VFCL, and VRCL	SJKF
SJKF Scat-dog genetic testing with Smithsonian	Genetic testing of 69 scat samples found during Scat-sniffing dog survey. Yielded 22 individuals on Project site and Conservation Lands.	September 9-15, 2010	Project Footprint, VFCL, and VRCL	SJKF

SURVEY NAME	SURVEY DESCRIPTION	DATES	LANDS SURVEYED	SPECIAL STATUS ANIMAL SPECIES DETECTED
Camera Trapping for San Joaquin Kit Fox	Camera Trapping (with bait) on the 10,889-acre Silver Creek Ranch. 20 camera trap locations *In Progress; 10 stations completed (West half).	Summer/Fall 2012 (September 25-November 5, 2012)	SCRCL	SJKF, AMBA, GKR, BUOW, tricolored blackbird
GOLDEN EAGLE/RAPTOR SURVEY				
Golden Eagle Survey	Golden eagle surveys conducted within a 10-mile radius via helicopter; golden eagles and other raptors were noted.	August 6 & 7, 2010	Helicopter surveys of a 10-mile radius around the Project Footprint and VFCL	GOEA
Golden Eagle Use Survey	USFWS Protocol GOEA surveys on project site and conservation lands	Fall and Winter 2013-2014	Project Footprint, VFCL, SCRCL, VRCL	GOEA
HABITAT SUITABILITY SURVEYS				
Detailed Habitat Mapping	Detailed Habitat Mapping of the Valadeao Ranch	June15-July 1 2010	VRCL	
General Habitat Mapping	General Habitat Mapping of the Silver Creek Ranch	September 3-5, 2010	SCRCL	
Occupancy Sampling	Occupancy sampling (Surveying for special status species within 5-acre plots over 5 survey periods (50 meter radius plots for GKR))	May10-July 27 2010	Project Footprint and VFCL	BNLL, coast horned lizard, San Joaquin coachwhip, GOEA, GKR, SJKF, AMBA
Distance Sampling	Distance sampling (Surveying for burrows and special status species along transects)	Feb 18-March 18, 2010	Project Footprint, VFCL, and VRCL	BNLL, coast horned lizard, mountain plover, GOEA, BUOW, loggerhead shrike, SJAS, GKR, SJKF, AMBA

SURVEY NAME	SURVEY DESCRIPTION	DATES	LANDS SURVEYED	SPECIAL STATUS ANIMAL SPECIES DETECTED
Giant Kangaroo Rat focused surveys	GKR focused surveys (100 50-meter radius plots) on the Silver Creek Ranch in source population polygons identified in Figure 41 of the Recovery Plan (USFWS 1998).	Summer 2012 (September 10-21, 2012)	SCRCL	GKR, SJKF, SJAS, BNLL, GOEA, AMBA
Spotlighting for San Joaquin Kit Fox	Spotlighting on the 10,889-acre Silver Creek Ranch and public roads in the vicinity surrounding the ranch.	Summer/Fall 2012 (September 23-November 5, 2012)	SCRCL	SJKF, AMBA, GKR, BUOW
Giant kangaroo rat distribution surveys	Identified potential and occupied habitat for GKR	February/March 2013	Project Footprint and VFCL, portions of SCRCL and VRCL	GKR, SJKF, GOEA, BUOW, coast horned lizard, mountain plover, SJAS

*Abridged protocol-level BNLL surveys were conducted according to the BNLL survey protocol with the exception of having less replication than the 12 adult and 5 juvenile surveys described in the BNLL survey protocol.

3.2 Environmental Baseline of the Action Area (Project Footprint and Conservation Lands)

The land in the general vicinity of the Action Area has been grazed historically for over 150 years. The earliest nonnative settlers of the San Benito County mountain ranges, foothills and valleys were Mexican citizens. In 1844, Mexican Governor Manuel Micheltorena granted a 22,000 acre tract of land in this region, (but not in the study area for this Project) called "Panoche de San Juan y los Carrisalitos" to Julian Ursua and Pedro Romero. Panoche Valley has always been sparsely inhabited with few buildings. Since the mid-1800s, the land has been used exclusively for cattle, sheep and horse grazing, and associated cultivation of forage crops, primarily alfalfa. According to evidence gleaned from historic maps and aerial photographs of the area dating from throughout the twentieth century, early landowners established clusters of buildings and structures related to their ranching or farming operations. Each cluster (there were less than ten total in the valley) typically had a stand of trees, and may have included residences, barns, sheds, water tanks, wells, shelters, corrals, troughs, and related outbuildings. A number of these clusters of buildings and structures have been demolished over the years, and other clusters of buildings have been destroyed and replaced. Evidence suggests that few, if any, new clusters have formed since the early 1900s.

The Panoche/Silver Creek Watershed is located upstream and west of Mendota, California, and is approximately 50 miles west of Fresno, California (**Figure 1**). The Panoche/Silver Creek Watershed is located in Fresno and San Benito Counties and lies on the western edge of the San Joaquin Valley in the Diablo Range. Soils in the watershed are derived predominantly from marine sediments (sandstones and shales) of the Moreno, Kreyenhagen, and Panoche Formations, and Franciscan Assemblage. These soils support a sparse vegetative cover on most hillsides, with more vegetative cover generally associated with flatter valley floor areas and hillslopes at higher elevations.

The Conservation Lands are surrounded by private cattle ranches and BLM-administered lands. The surrounding land use is primarily cattle ranching and open space. BLM lands are extensive in the Ciervo-Panoche Natural Area surrounding the site. BLM lands almost completely surround the SCRCL to the south, east, and north, and the Valley Floor and VRCL to the east. Areas of Critical Environmental Concern (ACECs), a BLM designation, are also extensive throughout this region.

3.2.1 Biotic Habitats

The Action and Conservation Lands are comprised almost entirely of annual, non-native grasslands used mainly to graze cattle and sheep. Ten biotic habitats were identified for the Action Area (**Table 9**). The habitats were classified as introduced annual grassland, ephedra subshrub/scrub, barrens, saltbush shrublands, juniper woodlands, oak woodlands, wetlands and associated habitats, mechanically disturbed and devegetated, ponds, and vernal pools. To the extent practicable, these habitats are based on the Sawyer and Keeler-Wolf (1995) and Sawyer et al. (2009) vegetation classification schemes. For a full description of these habitat types, please see **Appendix F**, Conservation Management Plan.

TABLE 9 BIOTIC HABITAT ALLIANCES IN THE ACTION AREA

BIOTIC HABITAT ALLIANCES	PROJECT FOOTPRINT	VALLEY FLOOR CONSERVATION LANDS (ACRES)	VALADEAO RANCH CONSERVATION LANDS (ACRES)	SILVER CREEK RANCH CONSERVATION LANDS (ACRES)	TOTAL
Introduced Annual Grassland	2,460	2,366	6,727	8,314	19,867
Ephedra Shrublands		-	2,705	2,259	4,964
Barrens		-	575	-	575
Saltbush Shrublands		-	476	-	476
Juniper Woodlands		-	68	-	68
Oak woodlands		-	16	-	16
Wetlands and Associated Habitats		-	2.1	233	235.1
Mechanically Disturbed & Devegetated		-	3	-	3
Ponds	1.6	1.6	2.4	-	5.6
Vernal Pools	0.3	2.9	0.2	-	3.4
Wash/Drainage/ Stream	13	88	-	-	101
No Data*	17	65	197	84	363
TOTAL	**2,492**	**2,523**	**10,772**	**10,890**	**26,677**

*No GIS data was available for these acreages

3.2.2 Project Footprint

The Project Footprint consists of the area within the fenceline of the solar facility and is composed of approximately 2,492 acres of introduced annual grassland (**Figure 7**). Historically, the Project Footprint was used for crop production; however, in the past approximately 40 years the site has been used for cattle grazing. The site is surrounded by rangeland and bordered by hills of the Gabilan Range to the west and the Panoche Hills to the east. The topography of the site dips gently down to the east-southeast. The site elevation ranges from approximately 1,200 feet amsl near the southeast end of the site to approximately 1,400 feet amsl near the west end.

FRESNO COUNTY

SAN BENITO COUNTY

Little Panoche Road

Yturiarte Road

Panoche Road

Energy Renewal PARTNERS, LLC

BR
10/15/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Introduced Annual Grassland
- Wash/Drainage/ Seasonal Stream
- No Data
- Vernal Pool
- Stock Pond

N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

Project Footprint and
Valley Floor Conservation Lands Biotic Habitats

Figure
7

The Action Area experiences a Mediterranean climate with dry hot summers and cool wet winters. However, this region does not experience heavy rainfall. Annual precipitation in the general vicinity of the site ranges from eight to ten inches per year. Approximately 85 percent of precipitation falls between October and March. Temperatures average approximately 80 degrees Fahrenheit (˚F) in the summer and 40˚F in the winter, mid-summer temperatures are often over 100˚F, and winter lows can be close to freezing. Nearly all precipitation infiltrates into the site's soils and flows in creeks and drainages when soil capacity has been reached.

Panoche Creek and Las Aquilas Creek run between portions of the Project Footprint but are contained entirely within the VFCL (**Section 3.2.3**). They are ephemeral creeks that are dry in the summer. Smaller washes and drainages feed these larger creeks. The Project Footprint site supports several seasonally flooded pools and stock ponds, predominantly in the northern portion of the Project Footprint along unnamed washes (**Figure 7**). Habitat for aquatic species and amphibians within the Project Footprint is limited to the few stock ponds and ephemeral pools.

There is no urban development on the Project site or surrounding area. Two ranching communities are located within the Panoche Valley, Panoche and Llanada. Both communities are within two miles of the Project Footprint. The nearest rural community is Firebaugh, approximately 15 miles from the perimeter of the Project Footprint.

Prominent grass species on the Project site include ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and rat-tail fescue (*Vulpia myuros*). Dominant forbs included broad-leaved filaree (*Erodium botrys*), red-stemmed filaree (*Erodium cicutarium*), shining peppergrass (*Lepidium nitidum var. nitidum*), and vinegarweed (*Tricostema lanceolatum*). Fiddleneck (*Amsinckia menziesii*), devils lettuce (*Amsinckia tessellata*), shepherds purse (*Capsella bursa-pastoris*), turkey mullein (*Eremocarpus setigerus*), and bur clover (*Medicago polymorpha*) were also common, especially along ranch roads. Areas which have not been previously disturbed by grazing or historic cultivation also include a variety of native wildflowers such as blow wives (*Achyrachaena mollis*), blue dicks (*Dichelostemma capitaum*), California gold fields (*Lasthenia californica*), yellow daisy tidy-tips (*Layia platyglossa*), and California creamcups (*Platystemon californicus*).

Reptiles that occur on-site include the BNLL, western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), coast horned lizard (*Phrynosoma blainvillii*), western whiptail (*Aspidoscelis tigris*), San Joaquin coachwhip (*Masticophis flagellum ruddocki*), Pacific gopher snake (*Pituophis catenifer catenifer*), California king snake (*Lampropeltis getula californiae*), and western rattlesnake (*Crotalus viridis*). Other reptiles that could potentially occur on the Project site include the Gilbert skink (*Eumeces gilberti*), California alligator lizard (*Elgaria multicarinata multicarinata*), and the valley garter snake (*Thamnophis sirtalis fitchi*).

Small mammals that could occur on the Project site include Botta's pocket gopher (*Thomonys bottae*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (Peromyscus maniculatus), and to a lesser extent the San Joaquin pocket mouse (*Perognathus inornatus*), short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*), and Tulare grasshopper mouse (*Onychomys torridus tularensis*). The CNDDB does not have any observations of the San Joaquin pocket mouse or short-nosed kangaroo rat within 3.1 miles (5.0 kilometers) of the site, and the most recent and closest observations for the Tulare grasshopper mouse was in 1938, just south of the site. The region and site do support various kangaroo rat species (*Dipodomys* sp.), including the Heermann's kangaroo rat (*D. heermanni*), giant kangaroo rat, and likely Merriam's kangaroo rat (*D. merriami*). Other small mammals observed on-site include the San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) and California ground squirrel (*Otospermophilis beecheyi*). Larger mammals that occur on the Project site include the SJKF (*Vulpes*

macrotis mutica), coyote (*Canis latrans*), cougar (*Puma concolor*), bobcat (*Lynx rufus*), and American badger (*Taxidea taxus*). Red fox (*Vulpes vulpes*), observed in the vicinity of site, and black-tailed deer (*Odocoileus hemionus columbianaus*) may occasionally occur ons-ite as well.

The abundance of small mammals that occur on the Project site attracts numerous raptor species including turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), and burrowing owl (*Athene cunicularia*). Other raptors that may use the Project site for foraging include the white-tailed kite (*Elanus leucurcus*), Swainson's hawk (*Buteo swainsoni*), common barn owl (*Tyto alba*) observed in the vicinity of the site, and great horned owl (*Bubo virginianus*) observed in the vicinity of the site. Non-raptor bird species observed on or in the vicinity of the Project site include the cinnamon teal (*Anas cyanoptera*), mountain plover (*Charadrius montanus*), rock dove (*Columbia livia*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californicus*), Anna's hummingbird (*Calypte anna*), loggerhead shrike (*Lanius ludoviscianus*), yellow-billed magpie (*Pica nuttalli*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), California horned lark (*Eremophila alpestris actia*), American pipit (*Anthus rubrescens*), Say's phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), European starling (*Sturnus vulgaris*), red-winged blackbird (*Agelaius phoeniceus*), tri-colored blackbird (*Agelaius tricolor*), western meadowlark (*Sturnella neglecta*), savannah sparrow (*Passerculus sandwichensis*), and house finch (*Carpodacus mexicanus*).

3.2.3 Project Conservation Lands

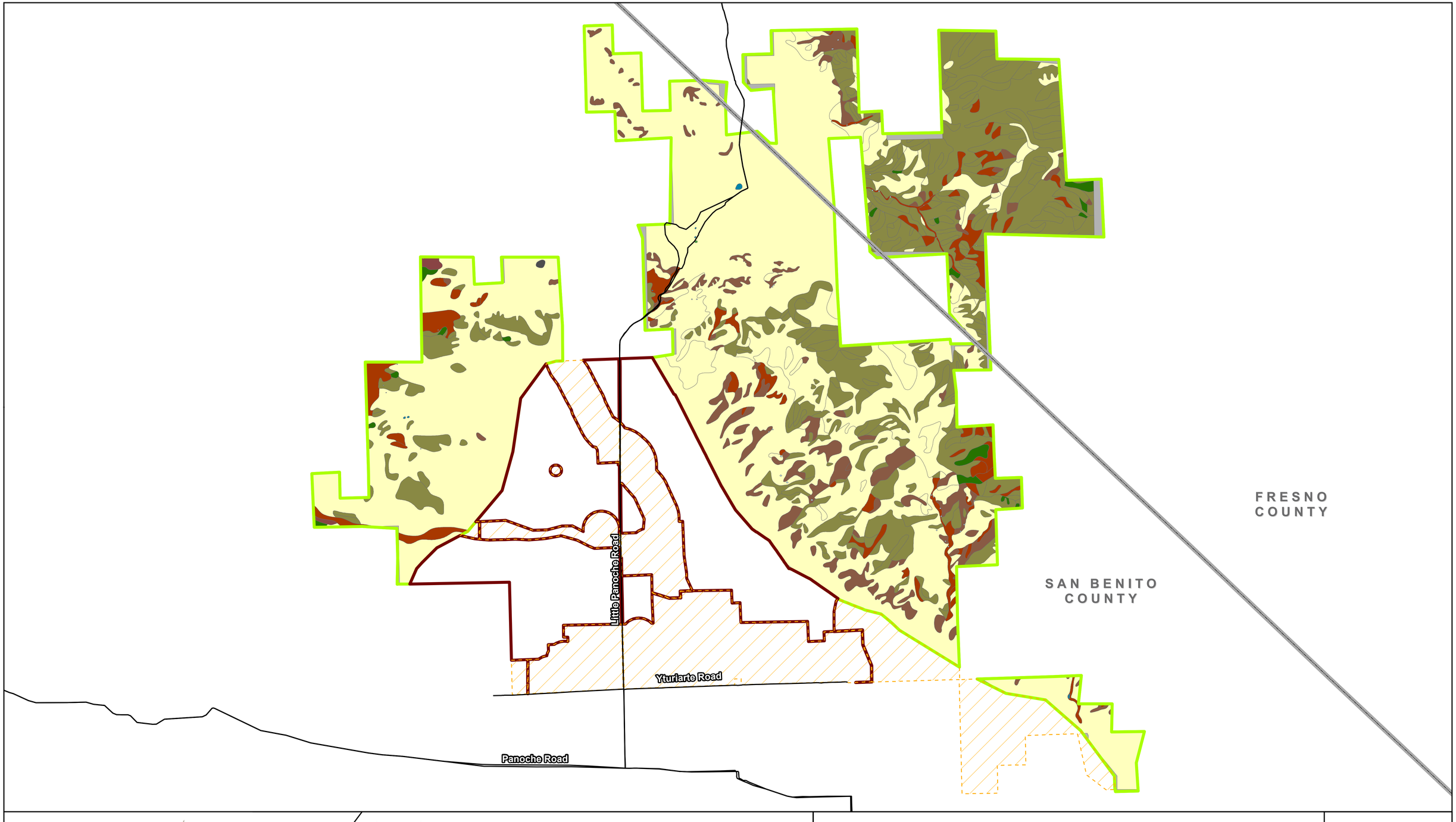
Project Conservation Lands include three areas totaling 24,185 acres that would be preserved in perpetuity for the benefit of the listed species discussed in this document as well as many other species of wildlife. A portion of these lands are contiguous with the VFCL that would be preserved, while some are located between the several build out areas in the Project Footprint and would effectively maintain connectivity through the entire Project Footprint. These Conservation Lands are considered a part of the Action, and their preservation in perpetuity is considered part of the Action. The Conservation Lands are described below; the status of federally listed species on these lands is discussed in **Section 4.0;** and the effects associated with the conservation of these lands are discussed in **Section 5.0**.

3.2.3.1 Valadeao Ranch

Figure 8 shows the various habitats within the VRCL.

3.2.3.1.1 Introduced Annual Grassland

The most widespread and dominant species are annual grasses; non-native herbaceous species are distributed more patchily. Species present in the Introduced Annual Grasslands include ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis*), foxtail barley (*Hordeum murinum ssp. leporinum*), and rat-tail fescue (*Vulpia myuros*). Dominant forbs included broad-leaved filaree (*Erodium botrys*), red-stemmed filaree (*Erodium cicutarium*), shining peppergrass (*Lepidium nitidum var. nitidum*), and vinegarweed (*Trichostema lanceolatum*). Fiddleneck (*Amsinckia menziesii*), devils lettuce (*Amsinckia tessellata*), shepherds purse (*Capsella bursa-pastoris*), turkey mullien (*Eremocarpus setigerus*), and bur clover (*Medicago polymorpha*) were also common, especially along ranch roads. Native species that maintain a presence must be generally tolerant of grazing and saline clay-rich soils. Areas which have not been previously disturbed by historic cultivation or been subject to heavy grazing also include a variety of native wildflowers such as blow wives (*Achyrachaena mollis*), blue dicks (*Dichelostemma capitaum*), California gold fields (*Lasthenia californica*), yellow daisy tidy-tips (*Layia platyglossa*), and California creamcups (*Platystemon californicus*).



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PARTNERS, LLC

BR
10/17/2013

Legend

- Valadeao Ranch Conservation Lands
- Project Footprint
- Valley Floor Conservation Lands
- No Data
- Introduced Annual Grassland
- Wash/Drainage/ Seasonal Stream
- Vernal Pool
- Pond
- Mechanically Disturbed
- Barrens
- Ephedra Shrublands
- Saltbrush Shrublands
- Juniper Woodlands
- Oak Woodlands

N

0 1,000 2,000 4,000
Feet

Panoche Valley Solar Project

Valadeao Ranch Conservation Lands Biotic Habitats

Figure
8

Grasslands dominate the lower slopes and valley bottoms in continuous stands that are interrupted only by a few larger washes. Some grassland patches were entirely comprised of non-native species, though these areas were uncommon. One California Native Plant Society (CNPS) List 4 species, serpentine leptosiphon (*Leptosiphon ambiguous*), was identified in this alliance.

3.2.3.1.2 Ephedra Shrublands

Plant associations that were noted to occur within the Ephedra Shrublands include *Artemisia californica - Senecio flaccidus* scrub, *Eastwoodia elegans - Ephedra californica* scrub, *Ericameria linearifolia - Ephedra californica* scrub, *Ericameria linearifolia - Ericameria nauseosa* scrub, *Ericameria linearifolia - Gutierrezia californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Artemisia californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Ephedra californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Gutierrezia californica* scrub, *Eriogonum fasciculatum* var. *polifolium - Yucca whipplei* scrub, and *Gutierrezia californica - Ephedra californica* scrub. Ephedra Shrublands occur in Las Aquilas Creek, an arroyo-like wash at the southwestern edge of VRCL, in small patches along ridgelines, steep slopes with a northern aspect, lower slopes, along ephemeral drainages, and steep rocky and thin-soiled south-facing slopes. Most shrub species in this alliance were widespread at low frequencies in areas beyond the extent of the assemblage where it dominates. In the understory layer, introduced annual grasses generally attain overwhelming dominance. The understory assemblage is often sparse, and non-diverse cover is typical of all study area shrublands associations that occupy xeric, steep slopes with southern aspect, although some associations in this alliance had dense understory. Other notable plants found within this alliance included introduced grasses, coyote brush (*Baccharis pilularis*), Silver lupine (*Lupinus albifrons*), narrow leaf milkweed (*Asclepias fascicularis*), Sandberg bluegrass (*Poa secunda*), crinkled onion (*Allium crispum*), white fiestaflower (*Pholistoma membranaceum*), foothill larkspur (*Delphinium hesperium* ssp. *pallescens*), and wild oats (*Avena* sp.) Native perennial species were generally sparse in this alliance. Two CNPS List four plants were observed within this alliance: naked buckwheat (*Eriogonum nudum* var. *indictum*) and Santa Clara thorn mint (*Acanthomintha lanceolata*). The transition zone between the Ephedra alliance of hillsides and the Introduced Annual Grassland alliance typical of lowlands was observed to be extensive and broad.

Other shrubland association canopy dominants are present in this zone at very low frequencies or in small, highly grazed patches. It is likely the position of this transition is maintained by long-standing patterns of range cattle grazing. Mature *E. californica* are apparently among the least palatable shrubs available to cattle, but recruitment of this species was seen only rarely where the populations occupied lowland areas mapped as Introduced Annual Grasslands. In contrast, diversity is much greater (especially among native species) where Introduced Annual Grasslands occupies shrubland canopy gaps on the more remote, upper slopes of the VRCL.

Ephedra shrublands within the VRCL range from nearly pure California ephedra (*E. californica*) stands to highly diverse associations with typical desert shrubs. Occupied habitats occur from lower slopes and valley bottoms to rocky outcrops and alluvial slopes. This 3 to 15 foot tall shrub rarely achieves greater than 10 percent cover (absolute), but the cover provided varies little with soil type, aspect, or grazing pressure. It is generally the only shrub present in the often very broad transition from Ephedra shrublands to Introduced Annual Grasslands.

The Ephedra alliance is more prevalent to the east of Little Panoche Road. There is evidence that it was more widespread on the western face of the Panoche Hills prior to a widespread fire that affected this area within the last decade, leaving many large *E. californica* stumps. Otherwise, all associations that were mapped in this alliance exhibit relatively undisturbed canopy development, have not been recently burned, and due to landscape ruggedness have not received heavy grazing pressure.

3.2.3.1.3 Barrens

Barrens are ridgelines and south or (rarely) west-facing very steep slopes that exhibit a precipitous drop-off in vegetative cover. In terms of vegetation, the assembled species diversity is very low, nearly all species are relatively short-lived annuals, shrubs and trees are absent, and introduced annual grasses become minor components of the species mix. Barrens most commonly interrupt Introduced Annual Grasslands where the transition was often observed to occur over the space of several feet. Barrens that interrupt shrublands alliance vegetation are less common, but were found to support occurrences of rare plant populations more often than any other mapped association. Botanical surveys conducted in the Panoche Valley and Panoche Hills suggest that Barrens habitats, while comparatively lacking in total cover, can support assemblages with greater native character, and can include rare species. Large patches of bare soil were not uncommon within barrens polygons mapped in 2010. Given that barrens are an exclusively annual collection of species, it seems likely that their aerial extent is variable, dependent on local rainfall amounts and the spacing of storm events. In comparatively dry years, it is conceivable that barrens extents could be expressed at up to twice the area mapped in 2010. Aerial photographs dated September 2008 consistently indicate greater barrens extents, especially on the lower western slope of the Panoche Hills immediately above the Panoche Valley Solar Facility.

Two plant associations were identified within the barrens: *Erodium cicutarium* - *Plantago erecta* and *Holocarpha obconica* - *Vulpia macrostachys*. Total cover in barrens rarely exceeds one percent on the VRCL. Members of the relatively sparse barrens assemblage are adapted to some of the harshest habitat available within the study area. Low cover may be resultant at least in part from low soil moisture retention and from erosion and use by rodents. The ridgeline and southern aspects are exposed to intense drying from sun and wind and are very steep. The soil surface appears to be highly eroded, and ground creep is evident. This habitat appears to be attractive to burrowing rodents, whose grazing and digging further affect plant cover. Finally, transitions to barrens are accompanied by a clear change in soil color; barrens can be grouped into “red”, “blue-grey”, and “white” clay soil types. Adjacent slopes of similar aspect and steepness, but lacking these unusually colored soils support typical (dense and tall) stands of Introduced Annual Grasslands or Ephedra alliance vegetation, suggesting a soil toxicity that may be inherent to the bands of red, blue-grey, and white clays. Plants occurring in barrens on the VRCL include the introduced annual herb *E. cicutarium*, and natives *P. erecta*, *Blepharizonia laxa*, *Monolopia* spp., *Phacelia tanacetifolia*, *Salvia columbariae*, and *Camissonia boothii*. Two CNPS List four species, naked buckwheat (*Eriogonum nudum* var. *indictum*) and benitoa (*Benitoa occidentalis*), and one CNPS List two species, California groundsel (*Senecio aphanactis*) were also identified in this alliance.

3.2.3.1.4 Saltbush Shrubland Alliance

Saltbush Shrubland consists of nearly pure to mixed stands of saltbush (*A. polycarpa*) associations. Occupied habitats range from white clay soils on hills immediately west of Little Panoche Road, to rocky outcrops and alluvial slopes experiencing high ground creep rates near ridgelines east of the road. In all observed occurrences on hills, the aspect of greatest *A. polycarpa* cover is southern. This two to three foot tall shrub also attains dominance within several of the ephemerally flooded washes, where sandier soils are more common. It is always the most common shrub canopy contributor near seasonal springs and seeps that exhibit saline character.

Two associations within this alliance exist on the VRCL: *Atriplex polycarpa* - *Eriogonum fasciculatum* var. *polifolium* and *Atriplex polycarpa* - *Isocoma acradenia* var. *bracteosa*. *Atriplex polycarpa* - *Eriogonum fasciculatum* var. *polifolium* occurs on slopes, appearing as mainly open ground with scattered shrubs. Shrub canopy closure averages five to 10 percent, with scattered clumps of 20 percent closure. Canopy density is greatest on south-facing slopes, where *E. fasciculatum* is often more prevalent, and on slopes that are steep or slippery enough to exclude grazing. The herbaceous layer is largely absent,

resembling barrens (described below) that are often present on adjacent slopes of similar aspect. Native character is thus relatively high, and undisturbed habitat (i.e., ungrazed) is available for potentially occurring rare plant species that are associated with saline soil. *Atriplex polycarpa - Isocoma acradenia* var. *bracteosa* occurs in the channel bottoms of ephemerally watered washes and very narrowly along the adjacent slope bases. All channels in which this association occurs also hold one or more ephemeral or seasonal springs that exhibit saline character and exhibit sandy soils that are somewhat atypical of the clay-dominated hill and valley soils of the study area. Shrub canopies are confined to wash edges due to trampling by range cattle, and average cover rarely exceeds 10 percent. The riparian corridor is thus normally rather indistinct in structure relative to the surrounding scrub, but the shift in species is consistent and sharply bounded. It is likely that this association was once and would become more widespread in ephemeral wash habitat in the absence of cattle use. But *A. polycarpa* appears to be highly palatable, and use by livestock in this steep and xeric landscape is concentrated in wash habitats.

3.2.3.1.5 Juniper Woodlands Alliance

Woodlands, including *Juniper woodland*s and *Oak woodland*s (see below), occur only on north-facing slopes of moderate steepness. Rocky outcrops and talus, which are commonly prominent in the study area's shrublands alliances, are absent from woodlands habitat. Finally, the area's woodlands are rather sparsely treed and share a common understory assemblage with shrublands (mainly introduced annual grasses), yet are noticeably devoid of a significant shrub layer.

The ecotones with adjacent shrub associations are often visually distinct, appearing as a sudden loss of the tree canopy. Individual *J. californica* rarely exceed 15 feet in height. Girths of up to 20 inches diameter at breast height suggest that most of the trees in all occurrences have aged enough to be called "mature". The tree population structure, furthermore, appears to be skewed toward older trees, and recruitment was not apparent. It is possible recruitment has been excluded by grazing cattle, as the gentler slopes occupied by this association do not exclude cattle use for grazing and shading. It is apparent from old stumps that trees of narrower girth have been harvested. Both occurrences east of Little Panoche Road were clearly larger in extent prior to harvest, and the older fence posts in these areas appear to be rough juniper.

The Juniper woodlands alliance is not common, totaling only 68 acres of the VRCL. All occurrences are less than 16 acres individually. Two associations within this alliance occur on the VRCL: *Juniperus californica - Ephedra californica* and *Juniperus californica - Ericameria linearifolia*. The *Juniperus californica - Ephedra californica* association occupies middle elevations of north-facing slopes. *J. californicus* canopy cover ranges from 5 to 20 percent. The shrub layer is sparse and is composed of mainly *E. californica*. Subdominant shrubs include *Ericameria linearifolia*, *Gutierrezia californica*, *Eriogonum fasciculatum*, and *Artemisia californica*. The herbaceous layer is never dense. It is composed mainly of introduced annual grasses, the same assemblage as found within the shrublands associations that dominate the surrounding landscape. The contrast in the shrub and herbaceous layers of adjacent shrublands and woodland associations is likely due to the presence of the trees. *J. californicus* patches are the only significant provider of shade across much of the study area, and so are gathering places for range cattle during much or all of the year. As such, trampling and intensified herbivory appear to be important limiting factors for plants that have not reached escape height. Roosting habitat for birds is provided, and evidence was seen of use by other large mammals such as coyote (evidence of deer was not observed anywhere within the study area). It is likely that, in the absence of grazing use, the association would provide habitats for native plant species that require additional shading. The *Juniperus californica - Ericameria linearifolia* association occupies middle to upper elevations of north-facing slopes. On average, canopy closure does not exceed ten percent. Both diversity and abundance of the shrub and understory assemblages are increased noticeably relative to the closely similar *Juniperus californica – Ephedra californica* association. In all occurrences, *E. linearifolia* achieves higher abundance and cover than other shrubs, including *Ephedra californica*. Greater understory development may be related to the

higher elevation, along with relatively steep slopes occupied by this association, which would tend to limit use by range cattle.

3.2.3.1.6 Oak Woodlands Alliance

Oak woodlands occupy lower slopes and wash edges with northern aspects. They transition upslope to *Juniper californica* woodlands. The oak woodlands were found in the hills west of Little Panoche Road only. These Oak woodlands can be associated with acorn-processing cultural resource sites. The terrain within the oak woodlands can be very rough. Steeply banked, tree-shaded gullies were observed to support a higher diversity of native annual and perennial herbs than any other habitat available in the woodlands, shrublands, or grasslands associations. This greater diversity likely results from cattle exclusion through rough terrain and fencing. The dependable seasonal shading that is provided by dense canopies of *Q. douglasii* (a winter-deciduous oak) creates additional microhabitats not available elsewhere, and generates considerably greater soil organic matter accumulation. Productivity and nutrient cycling functions, support of diversity (including wildlife), and arrest of ground creep (talus, gullies, and slides are common in shrublands) are enhanced by the presence of trees.

The *Quercus douglasii - Juniperus californica* association was the only association in this alliance found on VRCL. This association develops the highest tree canopy cover found within the study area and is starkly evident in the study area's landscape. The association's distribution is limited to two mapped polygons, but each occurrence is relatively large. The occurrence that was mapped at the study area's southwestern corner appears to extend well off-site to the west, and other large examples are visible on Gabilan Range slopes to the west. This woodlands association likely represents the region's most xeric and lowest elevation plant community in which *Q. douglasii* is dominant in this area. One CNPS List four species, Salinas milkvetch (*Astragalus macrodon*), was identified in this alliance.

3.2.3.1.7 Wetlands and Associated Habitats

Many wetland types occur on the VRCL; however, most hold water during only part of the year. Wetlands and associated habitats includes: ephemeral spring or seasonal springs, perennial springs, seasonal streams, washes, drainages, three associations: *Salix laevigata - Sambucus nigra* on perennial springs and *Distichlis spicata* and *Distichlis spicata - Isocoma menziesii* var. *vernoniodes* on ephemeral/seasonal springs, and riparian habitats consisting of three associations: *Populus fremontii* forest, zonal riparian, and *Tamarix* semi-natural shrublands.

The VRCL support ephemeral and seasonal seeps and springs, including the *Distichlis spicata* and *Distichlis spicata - Frankenia salina* associations. Ephemeral Springs and Seasonal Springs occurrences are embedded within or adjacent to occurrences of the *Atriplex polycarpa - Isocoma acradenia* var. *bracteosa* association, at ephemeral and seasonal seeps and springs. Dominants occur patchily and sometimes very densely. All occurrences are associated with drying soils (wet just beneath the surface in June) and a moderate to strong development of an evaporative saline soil crust. *A. polycarpa* growing in this association are invariably stunted by the habitat or by regular cattle browsing. Seasonally wet habitats are otherwise rare in the study area. It is certain that native species diversity is enhanced and maintained within these polygons. Species such as *Mimulus guttatus*, *Spergularia marina*, and *Sueada moquinii* were found in this limited association and not elsewhere within the study area.

The VRCL also support perennial springs and the *Salix laevigata – Sambucus nigra* association. Three perennial springs intersect the study area near or at its far western edge. All occur in steep, rocky channels at an elevation of about 1,300 feet. Alignment of these springs and of the less persistent seeps in this area suggests fault control of flows. Given the active seismic environment, it is likely expressions of this association are not long-lived in the study area. This hypothesis would be supported by the observations

of shrub dominance and general lack of older trees at study area perennial springs. For example, larger willows (*Salix laevigata*) and trees such as Fremont poplar (*Populus fremontii*) that occur at area streams are absent. Native perennial and shrub diversity, however, is greatly enhanced at these features. Cover is multi-layered and approaches 100 percent, providing excellent habitat for wildlife that rely on the surface water. Detailed or focused rare plant surveys and rare wildlife surveys, if implemented, should include these springs (and the widely scattered ephemeral and seasonal spring and seep features of the study area) as important locations for sampling and searching.

3.2.3.1.8 Constructed Ponds/Vernal Pools

There are several constructed ponds and vernal pools on the VRCL to capture occasional brief flows. These areas are typically located in the hills associated with this area and collect ephemeral and/or seasonal flows. The vernal pools located on the VRCL are shown on **Figure 8**.

3.2.3.2 Silver Creek Ranch

Several plant associations discussed below have already been discussed in greater detail above (e.g. Introduced Annual Grasslands). For those associations, please refer to **Section 3.2.3.1** for detailed descriptions. The descriptions below will be limited to the distribution and unique character of those associations within the SCRCL. **Figure 9** shows the habitats associated with the SCRCL.

3.2.3.2.1 Introduced Annual Grasslands

Grasslands on the SCRCL occur primarily on the lower slopes of the Griswold and Panoche Hills and valley bottoms and are largely composed of non-native annuals. Grassy cover was seldom observed to exceed 20 percent, giving the area a sparsely vegetated, somewhat desert-like appearance. In low precipitation years, much of the area classified as Grasslands may appear to be relatively barren of plants.

3.2.3.2.2 Ephedra Shrublands

Plant associations that were noted to occur within the Ephedra Shrublands include *Eriogonum fasciculatum – Ephedra californica* scrub, *Eastwoodia elegans – Ephedra californica* scrub, *Gutierrezia californica – Ephedra californica* scrub, *Ericameria linearifolia – Ephedra californica* scrub, and *Eriogonum fasciculatum – Hesperoyucca whipplei* scrub. Typically, the upland shrub assemblage at the SCRCL is neither dense nor diverse. Total shrub canopy cover exceeds five percent only in patch-scale stands. The most evenly and widely distributed species, *Ephedra californica,* also forms often expansive, monospecific overstories of less than two percent absolute shrub cover, which were classified within the area mapped as Grasslands.

3.2.3.2.3 Barrens

Areas classifiable as true "Barrens" are commonly embedded within Grasslands on south-facing aspects and on ridge areas, in both the Griswold and Panoche Hills. In relatively dry years, Barrens supporting less than one percent total cover may be expressed across as much as 30 percent of the area mapped as Grasslands on the SCRCL.

Panoche Road

New Idria Road

FRESNO COUNTY

SAN BENITO COUNTY

Legend

- Silver Creek Ranch Conservation Lands
- Introduced Annual Grassland
- Wetlands and Associated Habitats
- Ephedra Shrublands
- No Data

N

0 625 1,250 2,500

Feet

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10/15/2013

Panoche Valley Solar Project

Silver Creek Ranch Conservation Lands Biotic Habitats

Figure 9

3.2.3.2.4 Wetlands and Associated Habitats

Stands associated with seasonally or perennially moist substrates, including seeps and springs, appear to be very rare and unevenly distributed within the area. Riparian habitats occur along the Panoche and Silver Creeks. It should be noted that the SCRCL were not surveyed during the wet season; therefore, seasonal seeps and vernal pools on-site may not have been identified during the reconnaissance surveys.

Habitats at springs and seeps would typically support plant species that are dependent on a reliable availability of shallow groundwater to survive the annual drought (May-October), and the vegetation extent would be expected to narrowly adhere to the wetted zone. Plant associations adjacent to these resources, however, would also be subject to heavy grazing and trampling, given the historical and ongoing use of SCRCL for raising livestock. No flowing springs were found in an upland setting during the September survey. Evidence of seep zones that provide ephemeral flows and sustained root zone moisture in an upland setting were found only within one relatively deeply incised canyon near the southern survey edge. At the floor of this canyon, a small area of well-developed episalic crust was found at a clear shift from Shrublands to dominance by saltgrass (*Distichlis spicata*). Although not all incised features could be viewed in the available time, areas outside the Silver Creek and Panoche Creek riparian zones appeared to convey little runoff during the 2010 wet season.

Silver Creek riparian vegetation, where it briefly intersects the SCRCL, indicates a seasonally wet, somewhat saline habitat subject to annual or occasional energetic flows. The riparian corridor has become dominated by invasive tamarisk (*Tamarix* sp.) and is classified as Tamarix Semi-Natural Shrubland. Tamarisk has developed semi-open to impassable stands in a 30 to 100 foot wide corridor. The population extends well off-site both upstream and downstream. In this area, saltgrass appears to be the native species most tolerant of the soil salination and groundwater drawdown effects of heavy tamarisk infestation and often forms meadow-like swards between the tamarisk thickets.

Panoche Creek is gaining reach as it crosses through the SCRCL. The streambed upstream off the site for at least three miles was observed to be completely dry and largely devoid of plants. Within the surveyed area, this arroyo-like habitat quickly transitions to zonal wetlands characterized by gaseous springs, highly reduced soils, and marsh or meadow vegetation. The Panoche Creek riparian zone, which ranges from 100 feet to 500 feet in width, may provide the only reliable, naturally occurring surface water for much of the year. The dominant plants are consistently arrayed, with vegetation classified as emergent *Typha* marsh (Typha Herbaceous Alliance) centrally, and *Schoenoplectus americanus* mid-marsh (Schoenoplectus americanus Herbaceous Alliance) at the outer saturated edge, and *Distichlis spicata* meadow (Distichlis spicata Herbaceous Alliance) extending across the moistened to seasonally drying soils at the riparian edge. All riparian zonal alliances within the survey area are patchy, with one or two species at most attaining dominance. Co-occurring with species such as *Frankenia salina* and *Juncus mexicanus*, dominants in these three alliances indicate a somewhat saline and possibly alkaline soil and shallow groundwater environment. Trees are largely absent, as are species adapted to a floating or submerged habitat. A marsh environment that had developed in response to springs with excellent water quality would be expected to support a more diverse assemblage within each alliance, even with pressure from livestock use.

The small area of riparian woodland located south of Panoche Road is, like the *Distichlis* meadow, confined to the first terrace outside the saturated zone. The woodland canopy, classified as a degraded *Populus fremontii* Forest Alliance, reaches about 30 percent closure and includes a significant presence of red willow (*Salix laevigata*) where it is most dense. The stand currently exhibits many mature and dead trees, but essentially no recruitment and no understory due to intense livestock use. It is possible that this occurrence, and the marsh and meadow vegetation associated with the Panoche Creek riparian corridor on the SCRCL, are dependent upon annual inputs of relatively fresh water that originate in the upper

Griswold Creek and Panoche Creek drainages and serve to flush salts and toxins that accumulate in the topsoil and the plants as evapotranspiration consumes the perennial spring flows.

3.2.3.2.5 Constructed Ponds

Ponds constructed to capture any brief flows that do occur such as the ponds located throughout the hills and valleys on the VFCL and the VRCL were largely absent from drainages on the SCRCL; two constructed ponds were identified on the SCRCL. Rather, constructed water tanks and troughs for livestock are more common on the SCRCL, as the area appears to be largely devoid of naturally occurring, fresh surface water during the normal dry season.

3.2.3.2.6 Vernal Pools

Reconnaissance surveys on the SCRCL did not locate any vernal pools, however, these surveys were made during the dry season.

3.2.3.3 Valley Floor Conservation Lands

The VFCL are contiguous with the Project site and are primarily non-native annual grassland habitat with some seasonal ponds and vernal and ephemeral pools, as well as seasonally dry Panoche and Los Aquilas Creeks. The VFCL include the entire 100-year floodplain within the Project boundary on the valley floor. **Figure 7** shows the habitats associated with the VFCL.

4.0 SPECIES ACCOUNTS

An overview of species listing status, ecology, and local distribution is included below for the nine species included in this analysis. Information is based on available literature (peer reviewed as well as technical reports), recovery plans, data from nearby and/or similar projects and online databases such as NatureServe. Local species distributions include population information where available, and results of a search of the CNDDB for the United States Geological Survey (USGS) quads which encompass the Project Footprint, as well as all surrounding quads. No lands within the Panoche Valley, including the Project Footprint, have been designated or proposed Critical Habitat for any species listed under the ESA.

4.1 Giant Kangaroo Rat

Legal Status

The GKR is currently listed as endangered under the ESA. The GKR was proposed for listing on August 13, 1985 (50 FR 32585 32587) and finalized on January 5, 1987 (52 FR 283 288). No critical habitat has been established for the GKR. The species does not have its own recovery plan, but is included in the *Recovery Plan of Upland Species of San Joaquin Valley, CA* (USFWS 1998).

Species Ecology

The GKR is a very large, brownish kangaroo rat with a light brown tail tip. Adult male GKR can weigh up to 157 grams, nearly double the weight of other coexisting kangaroo rats (Grinnell 1932), and can have total length of 31.1 centimeters (cm). Another way to distinguish the GKR from other coexisting kangaroo rat species is the number of toes on the hind foot. The hind feet of adult GKR each have five toes and are longer than 4.7 cm (Best 1993).

Historically, GKR was known to occur over vast stretches of the western San Joaquin Valley, Carrizo Plain, and Cuyama Valley; as well as scattered colonies on steeper slopes and ridge tops in the Ciervo, Kettleman, Tumey, and Panoche Hills, and in the Panoche Valley (Grinnell 1932, Shaw 1934, Hawbecker 1944, USFWS 1998). The Panoche Region in western Fresno and eastern San Benito Counties is currently identified as one of the six major geographical units for remaining GKR populations. The remaining five major geographical units are Kettlemen Hills in Kings County, San Juan Creek Valley in San Luis Obispo County, western Kern County in the area of the Lokern, Elk Hills, and other uplands, Carrizo Plain Natural Area in eastern San Luis Obispo County, and Cuyama Valley in Santa Barbara and San Luis Obispo Counties (USFWS 1998).

The GKR is primarily a seed-eater, but occasionally consumes green plants and insects. Foraging takes place year round in all types of weather from around sunset to near sunrise, and most activity takes place within two hours of sunset. Ripening heads of grasses and forbs are cut off and placed in small surface pits in full sun located near the GKR's burrow system. After a period of time the seeds are moved into storage underground for consumption at a later date. The purpose of curing the seeds is to prevent mold growth after the seeds are moved below ground (Shaw 1934). Full sun exposure is important to ensure that seeds are fully cured. Largeleaf filaree (*Erodium macrophyllum*) and shining peppergrass (*Lepidium nitidum*) are two important seed producers utilized by GKR. Peppergrass species ripen earlier in the year and may be one of the more important seed sources for GKR (Williams et al. 1993). The ability to transport large quantities of seeds in cheek pouches, coupled with the highly developed seed curing and caching behaviors, probably allows GKR to endure prolonged droughts of one or two years without major regional population effects (Williams et al. 1993).

GKR live in burrow systems referred to as precincts, which is the most intensely used portion of the home range. Precincts consist of one to five separate burrow openings within one to eight meters of one another. A typical precinct has three burrows that are independent of one another and not interconnected (Williams and Kilburn 1991). Grinnell (1932) and Shaw (1934) found that precincts are occupied by a single animal. Precincts of individuals are arranged in colonies with other precincts, and colonies are generally separated by several hundred meters (Williams and Kilburn 1991). Precincts are easily spotted in spring due to the denser, lush vegetation compared to the intervening areas. Plants on a precinct are the first to turn green after autumn rains and the last to ripen and turn brown in the spring (Grinnell 1932, USFWS 1998). Population density can be estimated by counting precincts within a colony. Grinnell (1932) found that colonies contained between 18 and 69 precincts, with a mean of 52 individuals per hectare.

Female GKR have displayed an adaptable reproductive pattern that reflects surrounding population densities and food availability. During times of high density females have a short reproductive season during the winter (December to April). However, in times of low population densities females may continue to breed well into the summer (December to September; USFWS 1998). This ability to extend the breeding season can possibly lead to population irruptions during favorable climatic conditions. Populations in the northern reaches of the GKR range went from an estimated 2,000 individuals in 1980 – 1985, to an estimated 37,125 individuals in 1992 – 1993, following the end of a prolonged drought (Williams et al. 1995). During the post-drought January – May breeding season 44% of counted litters contained two young, one female had a litter of three, and the remaining 39% had a litter of one.

Young begin to disperse at approximately 11 – 12 weeks after birth. However, young may remain in their natal precinct in times of high population densities. The young may remain until the opportunity to disperse arises or they are driven off by their mother. Young often disperse into existing burrows of other adults that have died or moved to another location.

The GKR population is divided into two main sections. The northern population section is comprised of sub-populations in the Panoche Region, which include the Tumey Hills, Ciervo Hills, Monocline Ridge, Panoche Hills, and Panoche Valley sub-populations (Loew et al. 2005, USFWS 1998). Connectivity and genetic flow between these sup-populations is key to maintaining genetic diversity in GKR throughout the northern populations. Loew et al. (2005) used microsatellite DNA loci to analyze the amount of gene flow taking place between the northern sub-populations using samples from the various Tumey Hills, Ciervo Hills, Monocline Ridge, and Panoche Valley colonies. Results of these analyses suggested current or relatively recent connectivity between sub-populations in the northern population section (Loew et al. 2005). Results suggested that colonies in the Tumey Hills and Monocline Ridge sub-populations had recent connectivity, most likely via a corridor along Panoche Creek after its confluence with Silver Creek. Results also suggested that colonies in the Ciervo Ridge and Tumey Hills populations had been connected with the Panoche Valley population via long distance migrants or the use of smaller stepping-stone populations (Loew et al. 2005). Panoche Valley appears to be at the northwestern extent of the GKR subpopulations (USFWS 1998).

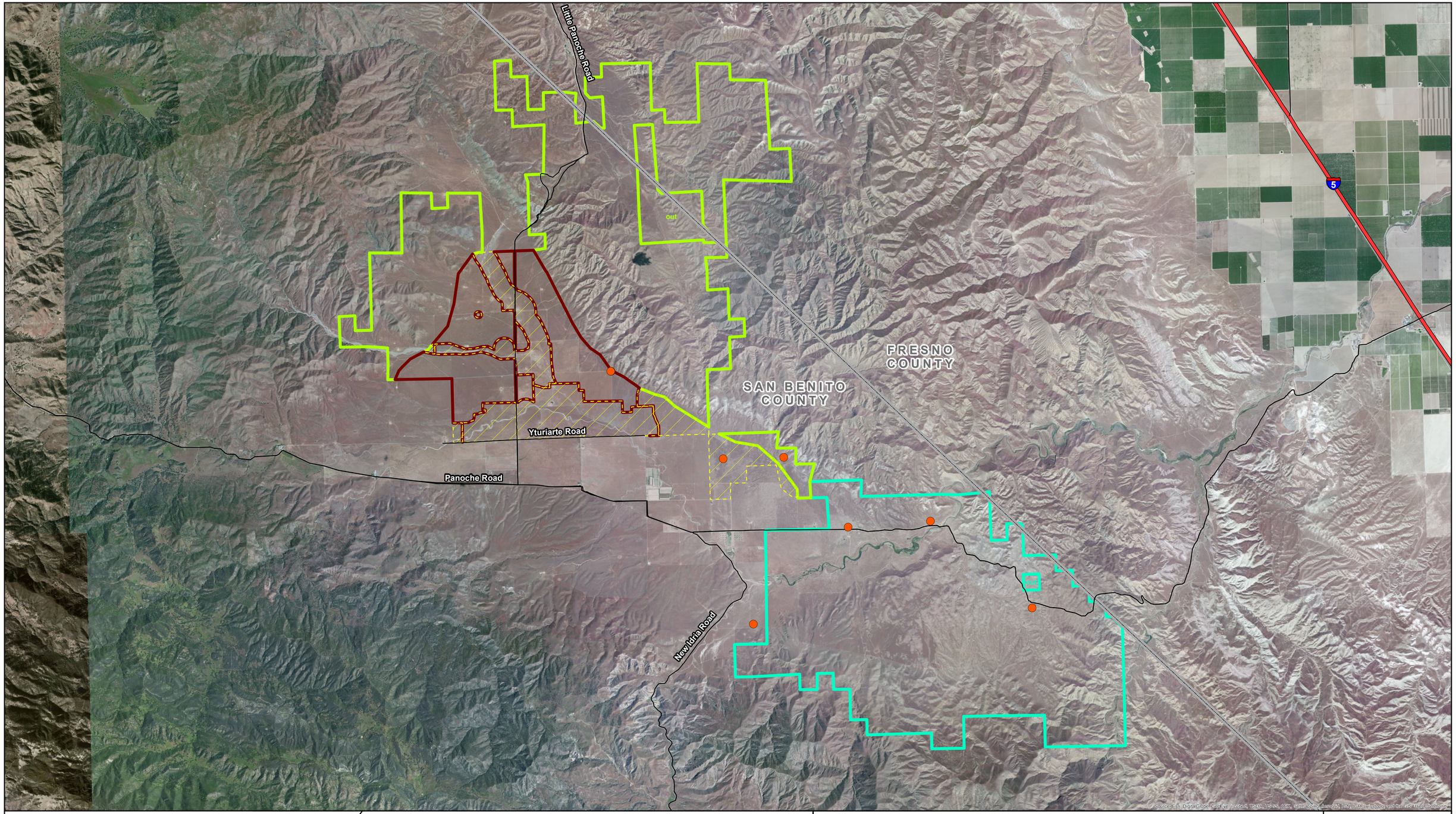
GKR often fall prey to numerous predators, including great horned owl, burrowing owl, short-eared owl, coyote, SJKF, and American badger. Snakes that might prey on GKR include coachwhip, gopher snake, common king snake, and western rattlesnake. When abundant, GKR out-compete other rodents within the colony and are the only rodent present (Grinnell 1932).

Local Distribution

GKR are known to occur within the Action Area. The CNDDB has records of the GKR occurring in Chounet Ranch (1958), Idria (1979), Mercey Hot Springs (1992), Monocline Ridge (1992), Panoche

(2004), and Tumey Hills (2006) USGS quads (**Figure 10**). The years in parenthesis represent the most recent CNDDB documented occurrence in each quad. According to the Recovery Plan (Figure 41 in USFWS 1998) and five-year Review (USFWS 2010a), the total GKR source population area in the Panoche Valley consist of 2,288.4 acres. The SCRCL support 90.3 percent (2,065.8 acres) of the source population area defined in the Recovery Plan and 5-year Review.

A thorough literature review revealed estimates of GKR density ranging from <1 to 271.7 per acre. The Panoche Valley population is likely to fall well within the lower half of this range (e.g., Williams (1992) estimated 0.82 per acre for the Panoche Valley). Most GKR research and studies to date have occurred in the southern portion of the range; however, three papers presented population density estimates for the northern portion of their range in the vicinity of the Project site (Grinnel 1932; Williams 1992; and Williams et al. 1995). All three papers presented densities estimated in above average precipitation years; therefore, it can be assumed that the population estimates presented in these papers are on the high end of real population densities that may occur in normal years. Williams et al.'s (1995) survey took place during a boom in the rodent population in response to precipitatio, and estimated an area with the population of 79 colonies. He estimated both area and colony size for several colonies on BLM land near the VRCL and on the SCRCL. **Table 10** summarizes the results of these studies as they pertain to the vicinity of the Project area.



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10/18/2013

Legend

- Project Footprint
- Giant Kangaroo Rat Location
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands

N

0 3,500 7,000
Feet

Panoche Valley Solar Project

CNDDB Giant Kangaroo Rat Records

Figure
10

TABLE 10 HISTORIC GKR DENSITY ESTIMATES REPORTED IN THE LITERATURE

LOCATION	ESTIMATED DENSITY (#GKR/ACRE)	ESTIMATED DENSITY (#GKR/HECTARE)	SURVEY PERIOD	PUBLICATION	ADDITIONAL INFORMATION
Panoche Valley region	0.82 to 21.04	0.33 to 8.51	July 1979 to October 1987 *Note: Above avg. precipitation*	Williams (1992)	2 in 6 hectares
Panoche Creek	3.64	1.47	1986 *Note: Above avg. precipitation*	Williams (1992)	
Panoche Fan	21.04	8.52	1932 *Note: Above average precipitation*	Williams (1992)	
Panoche Hills	2.43	0.98	1981 *Note: Above avg. precipitation*	Williams (1992)	
Panoche Valley	0.82	0.33	1979 *Note: Above average precipitation*	Williams (1992)	
Tumey Hills	2.83	1.15	1981 *Note: Above avg. precipitation*	Williams (1992)	
Near Valadeao Ranch	5.93 and 7.90	2.4 and 3.2	Summer of 1992 *Note: Above avg. precipitation*	Williams et al. (1995)	
On Silver Creek Ranch	2.25 to 36.33	0.91 to 14.71	Summer of 1992 *Note: Above avg. precipitation*	Williams et al. (1995)	
On Silver Creek Ranch	2.26 to 36.35 With an average of 11.99	0.91 to 14.72 With an average of 4.85	Summer of 1992 *Note: Above avg. precipitation*	Williams et al. (1995)	10 colonies were located #28-37; however, population estimates were not calculated for #28.
VFCL and adjacent private land.	No estimate	No estimate	Summer of 1992 *Note: Above avg. precipitation*	Williams et al. (1995)	No population estimate was made for colony #5.

LOCATION	ESTIMATED DENSITY (#GKR/ACRE)	ESTIMATED DENSITY (#GKR/HECTARE)	SURVEY PERIOD	PUBLICATION	ADDITIONAL INFORMATION
Elkhorn Plain Ecological Reserve†	26.9 to 136.8	10.9 to 55.4	5 years	Williams and Germano (1992)	
San Luis Obispo County*	37 to 271.7	15 to 110	7.5 years	Williams and Germano (1994)	Changes in density on 2 study plots.
Carrizo Plain	10	4.05		Braun (1985)	
Overall GKR Density	1 to 44	1 to 110	-	Recovery Plan (1998)	
Panoche Fan along Panoche Creek approx. 5.5 miles to the northeast of Silver Creek Ranch	16, 20, and 28 With an average of 21	6.48, 8.10, and 11.34 With an average of 8.50	February 1932 *Note: Above avg. precipitation*	Grinnell (1932)	For 3 separate acres

*These studies took place in the southern portion of the GKR range, and the Recovery Plan (1998) states that the Elkhorn Plain typically has much higher density estimates than other populations, suggesting that northern populations may exist in much lower densities.

Status On-Site

Reconnaissance surveys conducted in April 2009 found evidence of GKR precincts and scat throughout the Action Area. Multiple focused biological surveys performed in the Action Area between 2009 and 2013 (total of over 25,000 survey hours) have documented the presence of GKR in multiple locations. These surveys included protocol-level rare plant surveys, abridged 2009 protocol-level BNLL surveys, 2010 full-protocol-level BNLL surveys, distance sampling, occupancy sampling, and 100 percent coverage surveys specific to GKR for the purpose of documenting distribution of precincts in 2013.

Distance Sampling

A quantitative distance sampling effort was initiated in February and March 2010 to compare the density of GKR burrowing clusters on the Project Footprint and the VFCL and VRCL. The density estimate for the Project Footprint was 21.27 burrow clusters per kilometer^2 (km), while estimates for the VFCL and the VRCL (combined into a single stratum) were 36.74 burrow clusters per km^2.

Habitat Suitability Model

A patch-occupancy sampling effort was implemented that integrated a set of predictor variables (habitat characteristics) for the objective of deriving patterns of distribution for the GKR in the Action Area and in the Panoche Valley region. This sampling effort was based on repeated sampling (five repeated visits per sample location) for the presence or absence of GKR precincts at 135 sampling locations within the Project Footprint and the VFCL, each comprised of a circle with a 50 meter radius and an area of approximately 1.9 acres. Models were developed to predict the probability of GKR precinct occurrence as a function of landscape-scale habitat variables. A spatially explicit predictive model of GKR occurrence was then derived by the use of a multiple-logistic regression and an information-theoretic approach (**Appendices B and C**). This statistical approach provides for a robust prediction of GKR habitat suitability.

The habitat suitability model (HSM) derived for GKR provided estimates of occurrence based on the underlying habitat predictor variable. Therefore, statistical inferences as to the relative importance (high, moderate, and low) of the habitat for GKR can lead to identifying lands important for conservation. This is critical for a species whose population can increase or decrease by 6.6 times in the span of a few years (Williams et al. 1995). The portion of the source population area previously defined by Williams et al. (1995) and shown in Figure 41 of the Recovery Plan (1998), is entirely categorized as highly suitable GKR habitat per the HSM (**Figures 11 and 12**).

Average densities were calculated for distance sampling transects in high and moderately suitable habitat per the HSM (**Table 11**).

TABLE 11 ESTIMATED GKR DENSITIES IN THE PROJECT FOOTPRINT

HABITAT SUITABILITY	AVERAGE DENSITY OF GKR ON THE PROJECT FOOTPRINT AND VALLEY FLOOR CL (GKR/ACRE)	SOURCE FOR DENSITY ESTIMATES
High	1.56	Average density of GKR precincts for transects in highly suitable habitat on the Project Footprint and Valley Floor CL
Moderate	0.31	Average density of GKR precincts for transects in moderately suitable habitat on the Project Footprint and Valley Floor CL
Low	Count of 15	Adjusted number per the count of GKR precincts observed in habitat of low-suitability during transect surveys on the Project Footprint and Valley Floor CL

Based on the HSM, the VRCL support GKR in similar densities as the Project Footprint; these lands support small colonies, including hilltop colonies, and lack large colonies of GKR. The SCRCL support GKR in much higher numbers and densities than the Project Footprint and includes large areas defined in Figure 41 of the Recovery Plan (USFWS 1998) as source populations for the Panoche Valley. A habitat suitability map for GKR on the Valley Floor Conservation Land was derived, resulting in approximately 6,906 acres of suitable habitat.

Source Population Surveys

The GKR source populations on the SCRCL were surveyed in September of 2012 (**Appendix C**). The source populations were originally mapped by Williams et al. (1995). One hundred 50-meter (m) radius plots were surveyed for GKR and active precincts on the Silver Creek Ranch. GKR presence was verified by the presence of presumed scat (larger than 7 millimeters (mm)) and footprints (larger than 47mm) and further verified by the presence of surface pit caches as well as suitable burrows. Active precincts were identified by the presence of scat, footprints, tail drags and surface pit caches. Ninety-nine of the 100 plots surveyed supported GKR. Average density for these plots was 25.66 GKR precincts per plot, with

FRESNO COUNTY

SAN BENITO COUNTY

Little Panoche Road

Yturiarte Road

Panoche Road

Legend

- Project Footprint
- Valley Floor Conservation Lands
- HIgh Suitability
- Moderate Suitability
- Low Suitability
- No Data

N

0 625 1,250 2,500

Feet

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Panoche Valley Solar Project

Giant Kangaroo Rat Habitat Suitability

Figure
11

FRESNO COUNTY

SAN BENITO COUNTY

Little Panoche Road

Yturiarte Road

Panoche Road

Legend

- Project Footprint
- Valley Floor Conservation Lands
- GKR Core Populations
- High Suitability
- Moderate Suitability
- 2009-2010 GKR Precincts
- Low Suitability
- No Data

N

0 625 1,250 2,500
Feet

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Panoche Valley Solar Project

Giant Kangaroo Rat Observations and Habitat Suitability Model

Figure
12

an average of 13.23 per acre. As population densities of GKR on the Silver Creek Ranch within the source population polygons are high, and the suitable habitat of Silver Creek Ranch outside of these polygons is moderate, the average density for GKR plots on the Silver Creek Ranch was used for the source population areas. That density estimate was reduced (proportionally to reductions on the Project site and VFCL form high to moderate) to an estimate of 2.63 GKR per acre for the suitable habitat outside of the source populations. These density estimates were used to estimate a population of up to 44,871 individual GKR (**Table 12**).

TABLE 12 ESTIMATED NUMBER OF GKR ON VALADEAO RANCH AND SILVER CREEK RANCH CONSERVATION LANDS*

MITIGATION SITE	AVERAGE DENSITY OF GKR (GKR/ACRE)	GKR HABITAT (ACRES)	ESTIMATED NUMBER OF INDIVIDUALS	SOURCE FOR DENSITY ESTIMATES
Total Valadeao Ranch CL	**0.31**	**6,830**	**2,137**	**Average density of GKR precincts for transects in moderately suitable habitat on the Project site and Valley Floor CL**
Silver Creek Ranch CL† (High Suitability)	13.23	2,441	32,294	Average density of GKR precincts for 100 50-meter plots focused in source population polygons identified in the Recovery Plan (USFWS 1998) on the Silver Creek Ranch CL
Silver Creek Ranch CL† (Moderate Suitability)	2.63	4,782.3	12,577	Average density of GKR precincts for 100 50-meter plots focused in source population polygons identified in the Recovery Plan (USFWS 1998) on the Silver Creek Ranch CL reduced proportional to reductions in estimates on the Project site and Valley Floor CLs.
Silver Creek Ranch CL (Total)		**7,223.3**	**44,871**	**The total of the two rows above.**

*Based on empirical data collected in 2009, 2010 and Historical Data. 1992-1995 (Williams et al. 1995), 2009 and 2010 appeared to be relatively good for GKR. Population densities can be 6.6 times lower in poor years.
†Based on empirical data collected in 2012 on the Silver Creek Ranch Conservation Lands within source population polygons previously defined and previously identified in Figure 41 of the Recovery Plan (USFWS 1998).

GKR Distribution Surveys

Based on feedback and concerns expressed by the CDFW and the USFWS, a 100 percent coverage survey of the project area for GKR was conducted and a systematic stratified sampling effort was completed on the Conservation Lands in February and March 2013. Follow-up surveys on the Project Footprint were

conducted from July 13 to July 15, 2013, to verify and/or update the status of inactive sites. The survey methodology that was implemented was approved by CDFW and was provided to USFWS prior to start of the survey.

Field surveys used a grid sampling system whereby 30m x 30m grid squares were evaluated for the presence of GKR sign. Grid squares were arranged along north-south running parallel transects. Surveyors visually inspected each grid square for evidence of GKR precincts. Burrow precincts were considered occupied based on presence of scat, tracks, tail-drags, pit caches, fresh excavations, and cropped vegetation around a series of suitably sized horizontal and vertical burrow openings.

Precincts that did not appear to be occupied were also identified and mapped as inactive. Precincts were considered unoccupied when characteristic horizontal and vertical burrow openings and the surrounding area are devoid of all sign (fresh scat, tracks, fresh digging, and cropped vegetation). Evidence of other congeneric species was also noted and recorded as "other kangaroo rat".

Within the project area and Valley Floor Conservation Land, the surveyed grid accounted for 100 percent coverage plus a 500-foot buffer (in areas where landowner access was granted). The SCRCL and VRCL were surveyed using the same methodology described above but with wider transects. No buffers were surveyed for the conservation lands since surveyors did not have landowner access outside these areas. Transects were systematically distributed across the project area and included areas previously identified as high and low suitability habitats in past studies. The SCRCL and VRCL surveys were designed to cover approximately 20-30 percent of the Conservation Lands; therefore, transect spacing was approximately 148 meters.

A total of 48,446 survey grid cells were evaluated for GKR presence; 9,430 grid cells were not evaluated due to lack of landowner access, terrain that was too steep to be safely accessed, presence of bulls or other reasons precluding surveyors from entering the grid cell, or data equipment error. These areas are combined within the cells that are highlighted as "No Data".

Of the 16,775 total survey grid cells located within the project footprint and the 500-foot buffer study area, approximately 13,825 survey grid cells were able to be evaluated (11,858 within the project area boundaries and 1,967 within the 500-foot buffer). A total of 296 of these grid cells were observed to be active at the time of the survey (1.8% of evaluated cells). A total of 197 cells within the project footprint are considered active (1.7% of evaluated cells in the project footprint), while 99 cells within the 500-foot buffer were considered to be active (0.5% of evaluated cells in 500 foot buffer). The remaining 2,950 grid cells were not evaluated primarily due to lack of landowner access. These areas are combined within the cells that are noted as "No Data". **Table 13** describes the results of the GKR survey and **Figure 13** depicts the results of the GKR survey on the project footprint.

Yturiarte Road

Little Panoche Road

Panoche Road

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Legend

- Project Footprint
- Valley Floor Conservation Lands
- No Data
- No Activity
- GKR Evidence, Active
- GKR Evidence, Inactive
- Relict GKR Sign Present

N

0 1,250 2,500
Feet

Panoche Valley Solar Project

2013 Giant Kangaroo Rat Observations - Project Footprint

Figure
13

TABLE 13 GKR SURVEY RESULTS WITHIN THE PROJECT AREA

	GKR Grid Cell Status					
	Active	**Inactive**	**No GKR**	**Relict GKR**	**No Data**	**TOTAL**
Project Footprint	197	88	11,572	1	99*	11,957
500-foot Buffer	99	183	1,685	0	2,851	4,818
TOTAL	**296**	**271**	**13,257**	**1**	**2,950**	**16,775**

*No data areas in the project footprint were located along fenceline locations along the 500-foot buffer and VFCL. None are wholly within the project area. The entire Project Footprint area was surveyed during the GKR survey.

Of the 11,190 total survey grid cells located within the Valley Floor Conservation Land study area, approximately 10,001 survey grid cells were evaluated. A total of 896 of these grid cells were observed to be active at the time of the survey (9.0% of the cells evaluated). The 1,189 grid cells were not evaluated primarily due to lack of landowner access based on grazing operations or other restrictions. **Table 14** describes the results of the GKR survey and **Figure 14** depicts the results of the GKR survey on the Valley Floor Conservation Land within the study area.

TABLE 14 GKR SURVEY RESULTS WITHIN THE VFCL

	GKR Grid Cell Status					
	Active	**Inactive**	**No GKR**	**Relict GKR**	**No Data**	**TOTAL**
VFCL	896	740	8,364	1	1,189	11,190

VFCL = Valley Floor Conservation Lands

Of the 10,309 total survey grid cells located within the SCRCL study area, approximately 8,211 survey grid cells were evaluated. A total of 1,883 of these grid cells were observed to be active at the time of the survey (23.0% of the cells evaluated). The 2,098 grid cells were not evaluated due to lack of landowner access, terrain that was too steep to be safely accessed, or other reasons precluding surveyors from entering the grid cell. **Table 15** describes the results of the GKR survey and **Figure 15** depicts the results of the GKR survey on the SCRCL within the study area.

TABLE 15 GKR SURVEY RESULTS WITHIN THE SCRCL

	GKR Grid Cell Status					
	Active	**Inactive**	**No GKR**	**Relict GKR**	**No Data**	**TOTAL**
SCRCL	1,883	1,414	4,914	0	2,098	10,309

SCRCL=Silver Creek Ranch Conservation Lands.

Of the 10,166 total survey grid cells located within the VRCL study area, approximately 6,973 survey grid cells were evaluated. A total of 58 of these grid cells were observed to be active at the time of the survey (1.0% of the cells evaluated). The 3,193 grid cells were not evaluated due to lack of landowner access, terrain that was too steep to be safely accessed, presence of bulls or other reasons precluding surveyors from entering the grid cell. **Table 16** presents the results of the GKR survey and **Figure 16** depicts the results of the GKR survey on the VRCL within the study area.

Yturiarte Road

Little Panoche Road

Panoche Road

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Legend

- Project Footprint
- Valley Floor Conservation Lands
- No Data
- No Activity
- GKR Evidence, Active
- GKR Evidence, Inactive
- Relict GKR Sign Present

N

0 1,250 2,500
Feet

Panoche Valley Solar Project

2013 Giant Kangaroo Rat Observations - Valley Floor Conservation Lands

Figure
14

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Legend

- Silver Creek Ranch Conservation Lands
- Valadeao Ranch Conservation Lands
- Valley Floor Conservation Lands
- No Data
- No Activity
- GKR Evidence, Active
- GKR Evidence, Inactive

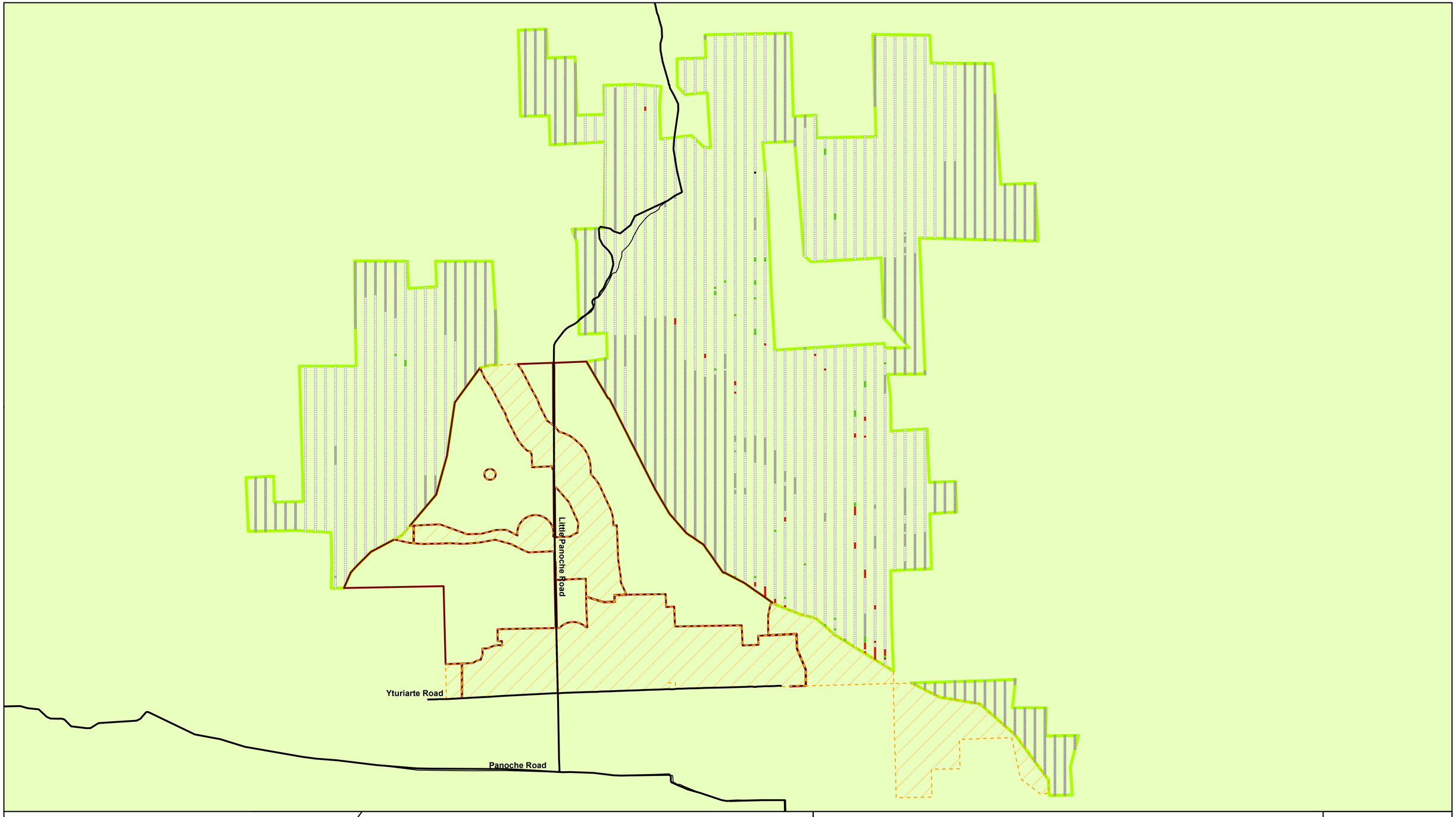
N

0 1,500 3,000
Feet

Panoche Valley Solar Project

2013 Giant Kangaroo Rat Survey Results - Silver Creek Ranch Conservation Lands

Figure
15



Energy Renewal PARTNERS, LLC

BR
10/16/2013

Legend

- Valadeao Ranch Conservation Lands
- Project Footprint
- Valley Floor Conservation Lands
- No Data
- No Activity
- GKR Evidence Active
- GKR Evidence, Inactive
- Relict GKR Sign Present

N

0 2,000 4,000
Feet

Panoche Valley Solar Project

2013 Giant Kangaroo Rat Survey Results - Valadeao Ranch Conservation Lands

Figure
16

TABLE 16 GKR SURVEY RESULTS WITHIN THE VRCL

	GKR Grid Cell Status					
	Active	**Inactive**	**No GKR**	**Relict GKR**	**No Data**	**TOTAL**
VRCL	58	48	6,866	1	3,193	10,166

VRCL = Valadeao Ranch Conservation Lands

Based on this most current survey information, a map of the active and inactive GKR cells was prepared, and larger colonial concentrations were delineated. Four of the larger colony concentrations within the Project Footprint were converted to GKR avoidance areas and added to the Valley Floor Conservation Land (approximately 58% of total active and inactive GKR blocks within the original project footprint). These areas were selected due to the large numbers of concentrated active and inactive GKR precincts, presence of high quality habitat, and direct connectivity to protected lands such as the Valley Floor Conservation Land, SJKF corridor, VRCL, and adjacent BLM landholdings. The summary above takes the move of the avoidance areas to the conservation lands into consideration.

The results of the 100 percent survey were used to generate estimates of the total number of GKR potentially supported in the Project Footprint. It was conservatively assumed that all 197 active cells were located in high quality GKR habitat even though habitat quality in the Project Footprint appears to be compromised over much of the occupied area due to past land use practices. An attempt was made to field verify the density of GKR per active cell; however, based on field conditions (heavy grazing), it was not possible to identify individually clipped precincts within the grid cells. Without performing systematic grid trapping study, it is assumed that each active cell within the Project Footprint is occupied with at least one individual GKR. This resulting assumed minimum density is within the range provided by Williams and above the density predicted by the HSM for the Project.

Using this density estimate for GKR within the Project Footprint, a minimum of 197 GKR are expected to occur within the Project Footprint currently. Typically GKR populations can fluctuate significantly from year to year and within years, potentially leading to a population increase across the Project Footprint outside of the cells identified as active during the survey. A population increase would likely result in occupancy of at least the currently inactive GKR cells found within the Project Footprint. Therefore, a minimum reasonably expected estimate of the population potentially supported within the Project Footprint is 285 individual GKR.

To account for possible increases in density from one year to the next, a potentially higher density should be assumed. Project Footprint densities of GKR are not available in literature. The only colony evaluated in Williams (1992) from the Valley Floor was not trapped and no density estimate specifically for that GKR colony was calculated. In the Panoche region, other density estimates are available for Silver Creek Ranch, the vicinity of Valadeao Ranch, and on the east side of the Panoche Region in the vicinity of Panoche Creek alluvial fan. Of these, the Project Footprint is most likely more similar to Valadeao Ranch than Silver Creek Ranch or Panoche Creek, given the very high quality habitat conditions present on the latter two. Therefore, using the maximum measured density for the Valadeao Ranch area (7.90 GKR/acre), up to 506 GKR may be present within the Project Footprint.

GKR are a species that has periodic population irruptions, resulting in large increases in numbers of individuals and potentially large areas of adjacent habitat becoming occupied over very short time periods. Although these population increases may follow years of favorable precipitation, a direct causative link has not been determined. When these events occur, existing populations can increase greatly. While this type of population increase is an observed phenomenon, predicting the resulting population on a particular area (e.g. Project Footprint) is problematic and not the typical condition.

4.2 San Joaquin Kit Fox

Legal Status

The SJKF is currently listed as endangered by the ESA. The SJKF was originally listed as being in danger of extinction under the Endangered Species Preservation Act of 1966 (32 FR 4001, March 11, 1967) and is currently listed as endangered under the ESA of 1973, as amended. No critical habitat has been designated for the SJKF. The SJKF is included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998).

Species Ecology

The kit fox was originally described by C. Hart Merriam (1888) near Riverside, CA. That area is now highly urbanized and no longer supports kit fox. Historically, eight subspecies of kit fox have been recognized, but now only two are recognized: kit fox (*Vulpes macrotis macrotis*) and SJKF (*Vulpes macrotis mutica*; Mercure et al. 1993). The kit fox is the smallest canid species in North America, and the SJKF is the larger of the two subspecies. Kit foxes have long, slender legs and are approximately 30 cm tall at the shoulder. The average male weighs 2.3 kilograms, and the average female weighs 2.1 kilograms (Morrell 1972). Kit foxes have a relatively small, slim body, large ears set close together, and a long, bushy tail tapering toward the tip. The tail is usually carried low and straight. The most common colorations are described as buff, tan, or yellowish-gray on the body. Two distinctive coats develop each year: a tan summer coat, and a silver-gray winter coat. The undersides vary from white to light buff. The tail is distinctly black tipped.

Other species of fox that occur in the Panoche Valley region include the red fox (*Vulpes vulpes*) and gray fox (*Vulpes cinereoargentus*). Because these three species inhabit the same region and are often fast moving, as well as nocturnal, identification of SJKF can be a challenge. The coat color and black tipped tail can usually distinguish the SJKF from the red fox. Gray foxes also have a black tipped tail, but also have a distinct black line running along the top to the tail, which is lacking in the SJKF. The small body size of the SJKF can also aid in identification.

Historically, SJKF was known to occur in most of the San Joaquin Valley from southern Kern County north to San Joaquin County (Grinnell et al. 1937); however the SJKF may have already had its range substantially reduced by the 1930's. Currently, the largest extant populations of SJKF are in western Kern County on and around the Elk Hills and Buena Vista Valley, and the Carrizo Plains Natural Area in San Luis Obispo County (USFWS 1998). The USFWS (1998) identified three core areas for SJKF populations: Carrizo Plain, western Kern County, and the Ciervo-Panoche Natural Area. The Ciervo-Panoche Natural Area consists of the Ciervo Hills, Tumey Hills, Panoche Hills, and the Panoche Valley. Cypher et al. (2007) identified the Panoche Valley and the Pleasant Valley populations as potential source populations for recolonizing reclaimed farmland in the San Luis Unit of the Central Valley Project. This study showed reasonable connectivity between Panoche Valley and Pleasant Valley along the western edge of the San Luis Unit, as well as reasonable connectivity between Panoche Valley, Pleasant Valley, and reclaimed farmland to the east. Survey efforts to determine SJKF population size are currently underway at Ciervo Panoche Natural Area in Fresno and San Benito Counties, Fort Hunter Liggett in Monterey County, and Camp Roberts in Monterey and San Luis Obispo Counties. Recent records from the 1980s and 1990s also exist for San Luis Reservoir in Merced County (Briden et al. 1987), North Grasslands and Kesterson National Wildlife Refuge on the valley floor in Merced County (Paveglio and Clifton 1998), and in the Los Vaqueros watershed in Contra Costa County. Optimal habitat for SJKF is arid with relatively low grassland vegetation. Preferred habitat is often dependent on the density of kangaroo rats and lagomorphs, the two favored prey items of SJKF.

SJKF are predominantly nocturnal, with peaks in activity occurring during crepuscular periods and are occasionally seen during the day during late spring and early summer (Meaney et al. 2006, Orloff et al. 1986). Distance of nightly movements varies depending on the season. Nightly movements on the Elk Hills Naval Petroleum Reserves averaged 15.4 km during the breeding season and 10.2 km during the pup-rearing season (USFWS 1998). Home ranges have been reported from as small as 2.6 km^2 to as large as 31 km^2 (USFWS 1998). Home ranges may overlap, depending on prey density and prey allocation. Zoellick et al. (2002) found that home range size and home range overlap of kit foxes did not differ between undisturbed areas and areas disturbed by the Naval Petroleum Reserves. Zoellick et al. (2002) showed up to a 30% home range overlap in kit foxes and surmised that this was due to a localized food source such as a high density of rabbits.

The diet of the SJKF varies seasonally and annually, based on variation in abundance of potential prey. In descending order of occurrence, white-footed mice (*Peromyscus* sp.), California ground squirrels, kangaroo rats, San Joaquin antelope squirrels, black-tailed jack rabbits (*Lepus californicus*), and chukar (*Alectoris chukar*) were identified in SJKF scat (USFWS 1998, Archon 1992). Other studies have shown that kangaroo rat and lagomorphs are important staples in the diet of SJKF (Meaney et al. 2006). Laughrin (1970) collected over 600 scat samples of SJKF, and 80 – 90% of this contained kangaroo rat remains (Laughrin 1970 *in* Meaney et al. 2006). Cypher et al. (2000) noted that SJKF abundance in the southern San Joaquin Valley was highly correlated with precipitation based prey abundance, particularly kangaroo rat. Drought years, which decreased kangaroo rat abundance, produced significant negative and rapid changes in kit fox abundance. SJKF is also an opportunist and will not pass up potential scavenging opportunities. Scat samples have also included human foods, paper, cloth, and larger mammals such as cattle and sheep that had been scavenged.

SJKF occupy several dens throughout their home range during the year. Dens are usually modified ground squirrel, badger, or coyote dens and can be up to 2.3 m deep (Tannerfeldt et al. 2003). Radiotelemetry studies indicate that foxes use individual dens for an average of 3.5 days before moving to a different den. Possible reasons for frequently changing dens include parasite load, prey depletion, and predator avoidance (Egoscue 1956, USFWS 1998); however, an adult SJKF can easily cover its entire home range in one night (Cypher et al. 2005). Multiple dens in the home range of an individual SJKF are necessary for thermal regulation, resting, and predator avoidance. Den openings are 20 – 25 cm high and less than 20 cm wide to exclude coyotes and badgers (Meaney 2006). Resting dens usually are simple with only one opening, while natal dens can be much deeper and more complex and have multiple openings. Artificial dens constructed by humans can act as suitable dens for SJKF. Artificial dens are generally lengths of buried pipe or culvert approximately 20 cm in diameter (Cypher et al. 2007).

Females are capable of reproducing at ten months old and begin searching for natal dens in September and October (USFWS 1998). Pair bonds between male and female kit foxes vary; some will mate for life while others may only remain together for a single breeding season. Kit fox litters can range from one to six pups, and success is often dependent on prey abundance (White and Ralls 1993). SJKF litter size averaged 3.8 for adults more than one year old and 2.5 for yearlings (Cypher et al. 2000). Natal dens have more than one opening and are changed two to three times per month. Females rarely hunt while lactating, and the male supplies the female with prey during the first few weeks of pup-rearing (Meaney 2006). Family groups generally split up in October, although pups may remain with the parents and assist with rearing the next generation.

Dispersal of yearling SJKF averaged eight kilometers during a six-year study on the Naval Petroleum Reserves (Scrivner et al. 1987). Long distance dispersals of up to 69 km by kit foxes throughout their range have also been noted (Meaney 2006). While agricultural lands may not represent suitable habitat for SJKF, they have been known to disperse through them. Agricultural lands, highways, aqueducts, and urban areas have all been used by dispersing SJKF (USFWS 1998). While these man-made obstacles do

not seem to inhibit SJKF dispersal and nightly movements (Zoellick et al. 2002, Cypher et al. 2005), fences and walls can create impenetrable barriers to kit fox movement (Cypher and Van Horn Job 2009). Simple fence alterations such as portals, larger mesh or hog wire, and elevating the bottom six inches off the ground can negate the negative effects of fences and walls and make them permeable to SJKF (Cypher and Von Horn Job 2009).

Predators of the SJKF include golden eagles, domestic dogs, coyotes, red foxes, and badgers. Cypher et al. (2005) radio collared 63 SJKF. Twenty-five of those were recovered dead, and of those 25, 12 (48%) were killed by large predators, most likely coyotes. Fences that are not permeable to SJKF as described above, can cause a serious threat to SJKF being chased by potential predators. However, a permeable fence may aid in SJKF escape if the fence is situated to provide through points at reasonable intervals and limits the ability of predators to pass through (Cypher and Van Horn Job 2009).

Local Distribution

SJKF are known to occur in the Project Footprint. The CNDDB has records of the SJKF occurring in Chounet Ranch (1977), Hammonds Ranch (1920), Idria (1975), Laguna Seca Ranch (2001), Llanada (1994), Mercey Hot Springs (2006), Ortigalita Peak (1975), Panoche (2006), Topo Valley (1987), and Tumey Hills (1989) USGS quads (**Figure 17**). The years in parenthesis represent the most recent CNDDB documented occurrence in each quad.

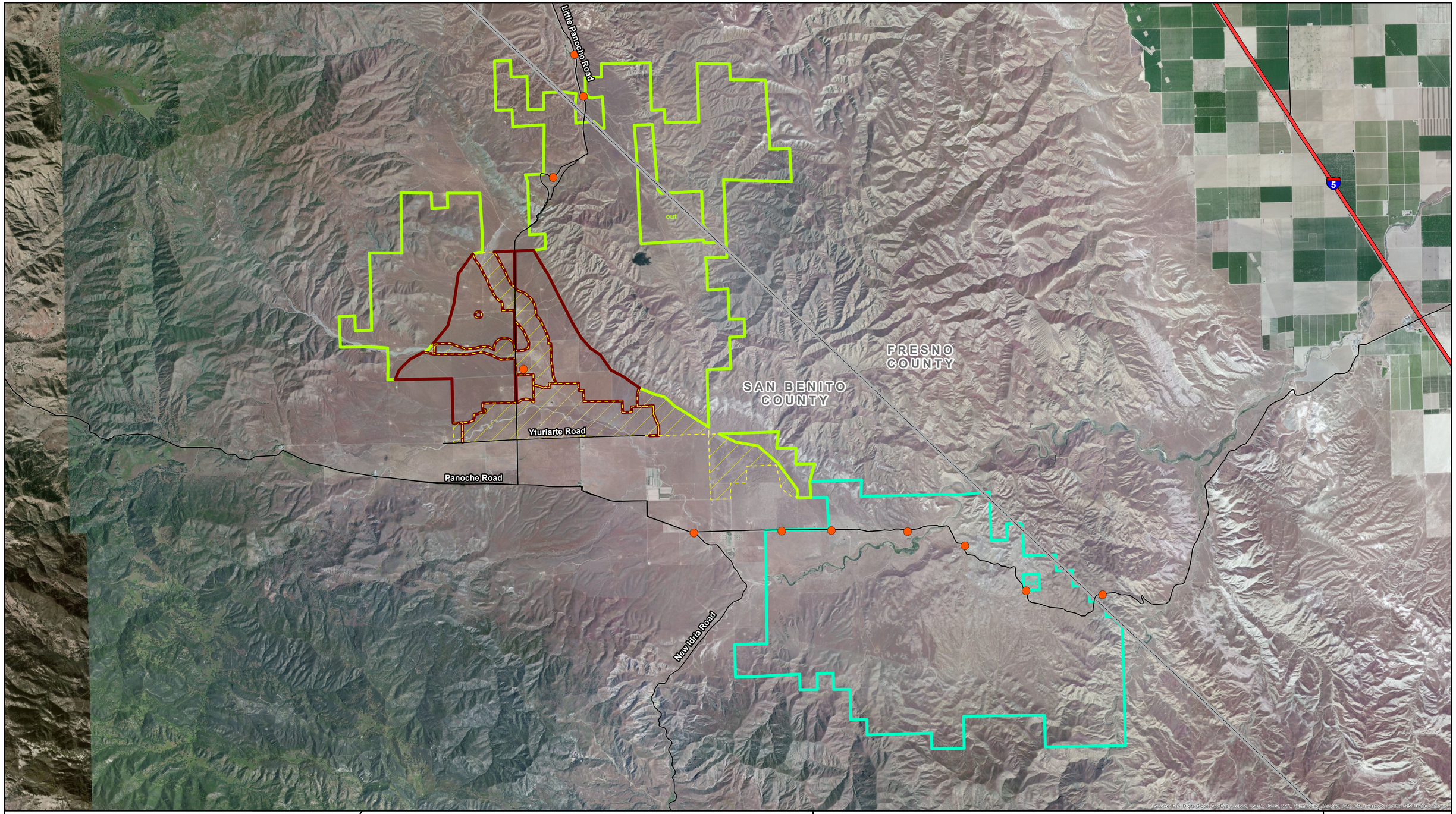
In addition to data that were collected in 2010 within a quantitative occupancy framework (135 five-acre plots visited five times each), a series of focused biological surveys have been performed on the Project Footprint since April of 2009, totaling over 25,000 hours of survey time (**Table 8**). These surveys have provided general information about the abundance and distribution of SJKF over the Project site.

The multitude of surveys conducted on-site found evidence of SJKF burrows and scat throughout the Project site.

Scat-sniffing Dog Surveys

Evidence of SJKF on the Project Footprint (and on the VFCL and portions of the Valadeao Ranch) was gathered during scat-sniffing dog surveys conducted by Working Dogs for Conservation. These surveys were conducted on-site between July 30th and August 16th, 2010, walking 33.19 miles (53.42 km) of non-random transects (**Appendices I and J**). During these surveys, 52 fresh (< 8 days old) and 311 old scats (> 8 days old) were collected. Individual SJKF mark their territory with urine and feces, as well as use latrines several times per day. The scats collected during these surveys were sent to the Smithsonian to have DNA analyzed. From these scat, 22 separate individual SJKF were identified in the study area of the Project site, VFCL, and VRCL (11 male and 11 female). Nine individuals were located on both the Project site and Conservation Lands, and 13 individuals were located exclusively on the Conservation Lands. As the scat-sniffing dog surveys were conducted at the end of the summer of 2010, the data collected represents a good estimate of the number of individuals occurring in the study area for a good year (the winter of 2009-2010 was a year with high precipitation, and 2010 was a year with a high density of prey species).

Scat was collected from up to 35 percent slopes, a slope that is much steeper than typically reported for this species. These results from empirical data defining slope use by SJKF in the local vicinity of the Project site is important to note, as species use landscapes differently in different locations and settings. Studies often report much lower slope ranges in the literature for this species, without defining what slopes were available for use in the study area (i.e., if all slopes in the study area are less than 15 percent, then SJKF use on slopes greater than 15 percent cannot accurately be assessed). The report entitled *SJKF*



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Legend

- Project Footprint
- San Joaquin Kit Fox Location
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands

N

0 3,500 7,000
Feet

Panoche Valley Solar Project

CNDDB San Joaquin Kit Fox Records

Figure
17

Scat-sniffing Dog Survey Results, Panoche Valley Solar Farm Biological Assessment provides additional details about these surveys (**Appendices I and J**).

Spotlight Surveys

Spotlighting surveys on the Silver Creek Ranch have been completed with 20.5 nights of spotlighting producing two to 10 SJKF observations per night. A total of 137 detections of SJKF and 11 detections classified as probable SJKF have occurred to date. It is important to note that kit foxes were detected within drainages, on flat land, on hill slopes, and even on ridges or hills. The SJKF observed on the Silver Creek Ranch Conservation Lands appear to use hills with much steeper slopes than previous literature suggests, which is similar to the results of the scat-sniffing dog surveys on the VRCL.

Camera Trap Surveys

Twenty camera trap stations were set up on the SCRCL and have recorded SJKF at 17 out of 20 stations. All camera traps were placed at least a half-mile from each other. The 17 detections occurred on 119 of 275 trap nights, resulting in approximately 43 percent detection. Individual camera trap detections of SJKF ranged from 0 percent to almost 64 percent detection (**Figure 18**). Only one station (#6) detected two SJKF in the same photo, all other stations detected one individual at a time. As SJKF rarely exhibit unique identifying features, individuals are difficult to distinguish. Therefore, it is not possible to confirm the exact number of individuals that visited any given camera trap location. See **Appendix G** for further discussion of Silver Creek Ranch surveys.

SJKF Den Locations

Concurrent with the 2013 GKR surveys, all known SJKF den and known SJKF natal den locations were recorded and mapped. A total of 46 SJKF dens were observed within the study area (37 known adult dens and 8 natal dens). **Table 17** presents the results by study area component and **Figure 19** shows the locations of these dens within the study area.

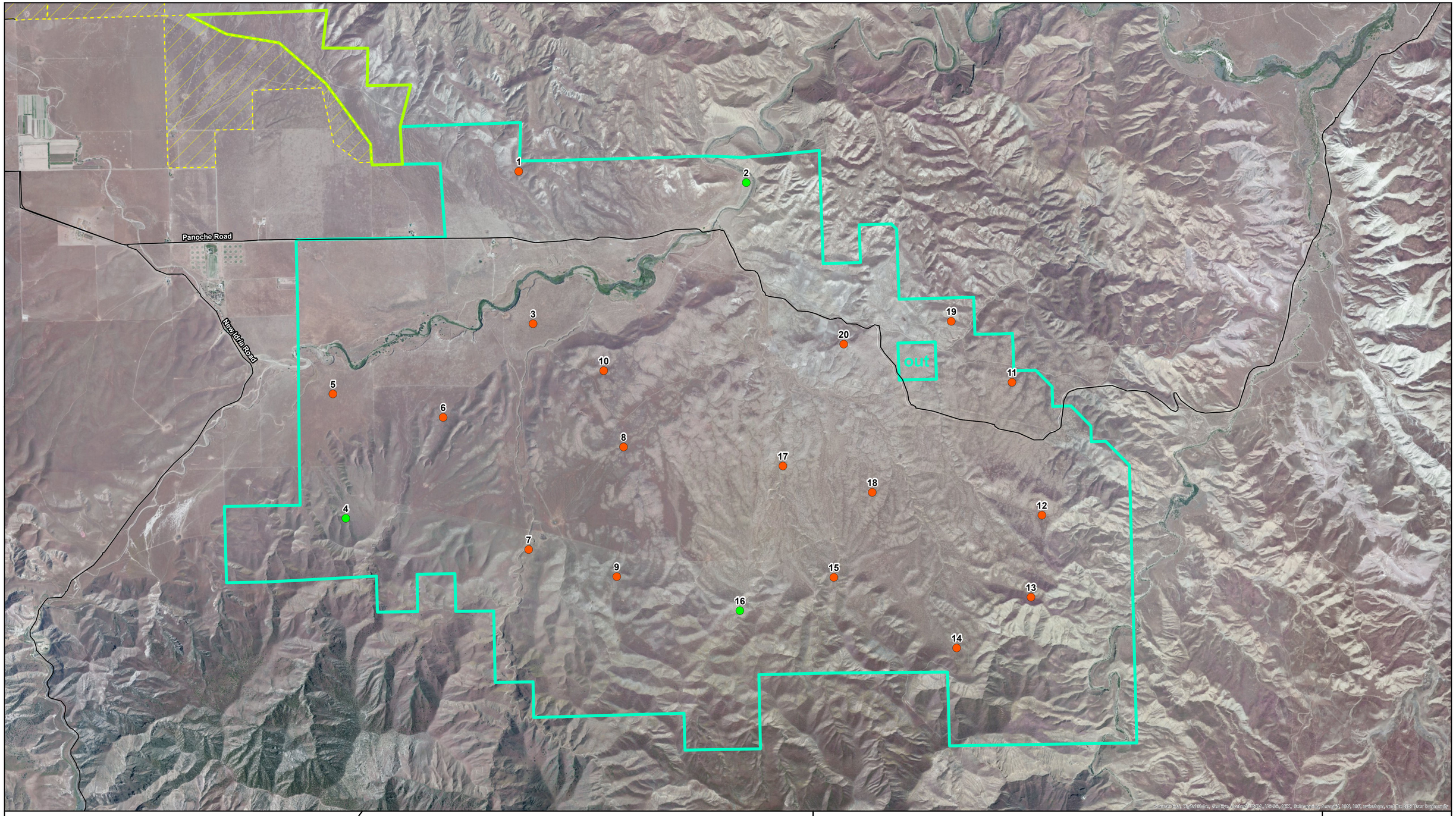
TABLE 17 SAN JOAQUIN KIT FOX OBSERVATIONS

	Project Footprint	VFCL	SCRCL	VRCL	Total
Known Dens	2	17	7	11	**37**
Known Natal Dens	1	5	1	1	**8**
TOTAL	**3**	**22**	**8**	**12**	**46**

VFCL-Valley Floor Conservation Lands
SCRCL-Silver Creek Ranch Conservation Lands
VRCL-Valadeao Ranch Conservation Lands

Habitat Suitability

The project conservation lands will be preserving approximately 24,185 acres that benefit the SJKF. However, any lands with greater than 11% slopes were presumed to be less than optimally suitable. This decision was made based on scat-sniffing dog results on the Project site, VFCL, and part of the VRCL. The proportion of lands considered suitable for SJKF was contingent upon the slope values such that, for example, 100% of lands with <11% slopes were considered suitable but only 50% of lands with 11.01-21% slopes was considered suitable. The scale used for ranking is described in **Table 18**.



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Legend

- Silver Creek Ranch Conservation Lands
- Valadeao Ranch Conservation Lands
- Valley Floor Conservation Lands
- SJKF Detected
- SJKF Not Detected

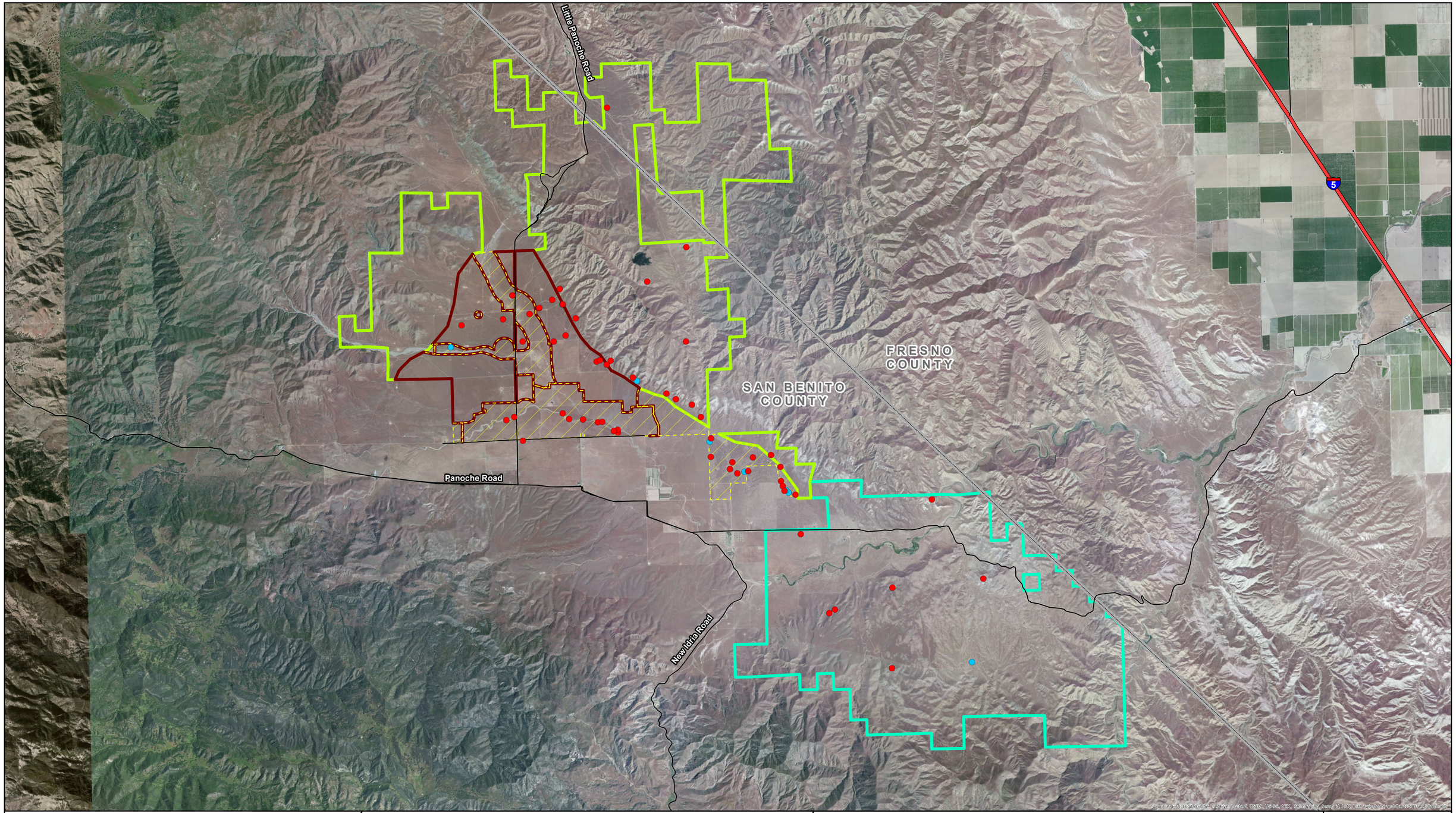
N

0 1,500 3,000
Feet

Panoche Valley Solar Project

San Joaquin Kit Fox Camera Trap Locations

Figure
18



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BR
10/15/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands

Status

- Natal/Pupping Den
- Known Den

N

0 3,500 7,000
Feet

Panoche Valley Solar Project

San Joaquin Kit Fox Den Locations

Figure
19

TABLE 18 SLOPE CLASSES AND SJKF SCAT

SLOPE CLASS	SCATS COLLECTED IN THIS SLOPE CLASS	PRORATED HABITAT SUITABILITY ACRES	ACRES OF LAND: ACRES OF SUITABLE HABITAT
0-11%	70%	100% Suitable	1:1
11.01-21%	18.5%	50% Suitable	1:0.5
21.01-35%	11.5%	25% Suitable	1:0.25
>35%	0%*	0% Not Suitable	1:0

The Project Footprint contains 2,492 acres of suitable SJKF habitat. The Conservation Lands contain approximately 14,863 acres of suitable SJKF habitat according to this method. It is important to note that the Conservation Lands contain approximately 24,185 acres that would be managed for and could potentially be used by SJKF.

4.3 Blunt-nosed Leopard Lizard

Legal Status

The BNLL was originally listed as being in danger of extinction under the Endangered Species Preservation Act of 1966 (32 FR 4001, March 11, 1967) and is currently listed as endangered under the ESA of 1973, as amended. No critical habitat has been designated for the BNLL. The BNLL is included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998).

Species Ecology

The BNLL is most closely related to the long-nosed leopard lizard (*Gambelia wislizenii*) and was originally thought to be a subspecies. Montanucci (1970) presented solid information for the separation of the two species based upon studies of hybrids between the BNLL and long-nosed leopard lizard. The two species will hybridize where their ranges overlap. Adult male BNLL are larger than females, ranging in size from 8.7 to 12.0 cm in snout-vent length. Total length including the tail can be up to 35.7 cm (Germano and Williams 2005). Adult males weigh between 31.8 and 37.4 grams, and adult females weigh between 20.6 and 29.3 grams. BNLL are quite often the largest lizard throughout its range, and coloration can vary greatly. Background colors on the dorsal surface can range from yellowish, light gray or dark brown depending on the surrounding soil and vegetation. The ventral surface is uniformly white. The color pattern on the back consists of longitudinal rows of dark spots interrupted by white, cream, or yellow bands. These cross bands can aid in distinguishing the BNLL from other leopard lizards; the cross bands of the BNLL are much broader, more distinct, and extend from the lateral folds on each side of the body. Juvenile BNLL have blood-red spots on the back that darken with age.

BNLL originally inhabited the San Joaquin Valley, ranging from Stanislaus County in the north to the Tehachapi Mountains of Kern County in the south (Montanucci 1970). The foothills of the Sierra Nevada and Coast Range Mountains defined the eastern and western boundaries. The currently known occupied range of the BNLL is scattered in undeveloped lands of the San Joaquin Valley and Coast Range foothills. The Ciervo, Tumey, and Panoche Hills and the Panoche Valley all support populations of BNLL in the northern portions of its range. They inhabit native and non-native grassland and alkali sink scrub communities characterized by poorly drained, alkaline, and saline soils. They are also found in the chenopod (i.e., goosefoot) community associated with non-alkaline, sandy soils in the alluvial fans and foothills of the southern San Joaquin Valley and Carrizo Plain. Other suitable habitat types on the valley floor for this species include Valley Needlegrass Grassland (Holland 1986), Alkali Playa (Holland 1986) and Atriplex Grassland (Tollestrup 1976). Habitats in order of decreasing favorability include:

1) clump grass and saltbush grassland, with sandy soil,
2) dry washes with scrub brush, in native/non-native grassland, with sandy soil,
3) alkali flats, with saltbush in sandy or gravelly soil, and
4) grassland with hardpan soil.

The BNLL is generally absent from areas of steep slopes and dense vegetation, and areas subject to seasonal flooding (USFWS 2010). The most important aspect of any BNLL habitat is sparse vegetation. BNLL rely mainly on speed to avoid predators and catch prey. A thick cover of herbaceous vegetation impedes BNLL movement, making them more vulnerable to predators and less likely to capture prey. In areas with thick herbaceous vegetation, BNLL will utilize barren washes and roads (Warrick et al. 1998). Adult BNLL emerge from below ground dormancy in early- to mid-April and remain active into July and August (Germano and Williams 2005, CDFG 2004). Adults are rarely seen in September. Hatchlings emerge in July and remain active into late October and early November (Germano and Williams 2005, CDFG 2004). Optimal air temperatures for BNLL range between 23.5˚ and 40˚C, and optimal ground temperatures are between 22˚ and 36˚C. Home range areas differ between males and females, and BNLL home range estimates have been estimated by several individuals. Early BNLL home range studies (i.e., Tollestrup 1979), described home ranges of less than 2.4 acres for both males and females. However, that study was based on only three days of lizard assessment on a habitat grid. Later studies provided additional information on home range estimates (**Table 19**).

TABLE 19 BNLL HOME RANGE ESTIMATES

Investigator	Date	Study Location	Findings	Home Range Estimate
Tollestrup	1979	Western San Joaquin Valley	Home range < 2.4 acres for both males and female BNLL. Based on 3 days of data.	<2.4 acres
Warrick et. al.	1998	Kern County	16 BNLL radio-tagged (8 dense grassland vegetation, 8 sparse grassland vegetation) at 2 sites at Naval Petroleum Reserves.	22 acres
Germano	Unpublished data (2004)	Kern County (western)	Based on the data from 60 BNLL (total of 83 BNLL radio-tagged) at >25 locations at Lokern Natural Area Study site (southeast of San Benito County). Habitat included scrub wash, flats with no wash, and scrub flats.	52.4 acres

Males will aggressively defend their home ranges against other males. Germano and Williams (2005) noted many instances of males with scars matching the outline the jaws of other adult BNLL. Other

studies had Passive Integrated Transponders (PIT tags) broken by fighting males (Germano and Williams 1993).

Other lizards which may overlap with the BNLL include the side-blotched lizard (*Uta stansburiana*), western whiptail (*Aspidoscelis tigris*), and coast horned lizard (*Phrynosoma coronatum*; Stebbins 2003). The BNLL is the largest of these lizards and will consume smaller lizards when given the opportunity. Germano and Williams (2005) noted adult BNLL eating side-blotched lizards and smaller BNLL. While adult BNLL do not hesitate to prey on smaller lizards, grasshoppers, crickets, and beetles make up the majority of their diet (Germano et al. 2007). Diet preferences can vary by location and year. Coleopterans made up the bulk of BNLL diet on the Elkhorn Plain and Lokern Natural Area. Grasshoppers were the main prey source on the Kern Front Oil Field (Germano et al. 2007). Bees, wasps, and ants will also be taken by BNLL, although in smaller numbers than grasshoppers and beetles.

Adult BNLL emerge from dormancy in early April, and breeding activity begins within a month of emergence. Breeding activities last from April through the beginning of June and may last throughout June. Eggs are laid in June and July, with clutch size ranging from two to six eggs (Montanucci 1967), and hatchlings emerge after approximately two months of incubation. Germano and Williams (2005) first noted hatchlings appearing on the Elkhorn Plain in mid-July, depending on the weather trends of that year. Cool wet weather patterns in April may delay the emergence of adults, thus delaying egg lying and hatchling emergence.

Potential predators for the BNLL include other adult BNLL, whipsnakes, gopher snakes, western rattlesnake, American kestrel, prairie falcon, burrowing owl, various diurnal raptors, loggerhead shrike, coyote, SJKF, and American badger. Germano and Williams (2005) found several individuals which had been struck by passing vehicles.

Local Distribution

The BNLL is known to occur in the Project Footprint. The CNDDB has records of the BNLL occurring in Cerro Colorado, Chounet Ranch (1958), Hammonds Ranch (1978), Idria (1980), Laguna Seca Ranch (1993), Mercey Hot Springs (2005), Panoche (2004), and Tumey Hills (1993) USGS quads (**Figure 20**). The years in parenthesis represent the most recent CNDDB documented occurrence in each quad.

Few studies have calculated population density estimates for the BNLL. **Table 20** Shows density estimates in the literature.

TABLE 20 BNLL POPULATION DENSITY ESTIMATES IN THE LITERATURE

LOCATION	DENSITY (ACRES)	LITERATURE	NOTES
Elkhorn Plain	0.95-21.85	Williams et al. (1993) and Germano and Williams (2005)	Both of these studies show a strong response of BNLL to precipitation patterns, with drought years resulting in lower populations and low to no observed occurrences of adults.
Pixley National Wildlife Refuge in Tulare County	1.3	Recovery Plan (1998) citing Tollestrup (1979)	
Pixley National Wildlife Refuge in Tulare County	0.1-4.2	Recovery Plan (1998) citing Uptain et al. (1985)	Surveyed the same population as Tollestrup at a later date.
Pixley National Wildlife Refuge in Tulare County	0.12-4.17 with an estimated 1.01-33.32	Uptain et al. (1992)	Overall density on eight 8-hectare plots.
Pixley National Wildlife Refuge in Tulare County	1.01-33.32	Uptain et al. (1992)	For each plot ranging from 1.01-33.32 BNLL/acre with densities varying between Spring, Summer, and Fall surveys. (same paper as above)
Unknown location in Marginal habitat	0.2	Recovery Plan (1998) citing Mullen (1981), Le Fevre in lit (1976), and Madrone Associates (1979)	

As none of these surveys took place in a shrubless habitat such as occurs on the Project site in Panoche Valley, population densities are expected to be less in the Panoche Valley than the previous reports for the Elkhorn Plain and Pixley National Wildlife Refuge.

Abridged Surveys

Abridged protocol-level adult BNLL surveys on Section 10 and 15 were completed (within the portions of both the Project area and the VFCL) between June 10th and July 15th, 2009, following the CDFW protocol for such surveys. The surveys conducted in 2009 consisted of the following:

- 3.5 full-coverage adult-BNLL surveys completed on Section 15 between June 10th and July 15th, 2009
- Eight full-coverage adult-BNLL surveys completed on Section 10 between June 10th and July 15th, 2009
- Five juvenile-BNLL full-coverage surveys completed on Sections 10 and 15 between August 3rd and September 1st, 2009

In late April of 2010, the Applicant initiated both full-protocol adult season BNLL surveys on Section 16 (covering portions of both the Project Footprint and the VFCL) and dynamic occupancy sampling

(**Appendix K**) within 135 sample locations (each point was buffered by five acres or two hectares) spread over the entire Project Footprint and VFCL (**Figure 20**).

No BNLL were observed in Section 10 at any time during the 2009 surveys, however two adults were detected in Section 10, within the 100-year floodplain of Las Aquilas Creek, during the occupancy sampling conducted in 2010. The adult BNLL found in Section 15 were mainly in association with Panoche and Las Aquilas Creeks, which is consistent with known habitat preferences of washes and floodplains (Warrick et al. 1998), especially in areas where dense vegetation comprises the upland habitat. Juvenile BNLL were found along washes and farther into the upland habitat as they dispersed. Adult BNLL were observed in and near Panoche Creek in Sections 10, 14, 15, and 16 (**Figure 21**) during 2010 surveys.

No BNLL were observed on VRCL, although suitable habitat is contiguous within the western and southeastern edges of the Project site. Additional potential habitat occurs on the floor of Little Panoche Valley (northern portion of the VRCL).

Silver Creek Ranch BNLL Surveys

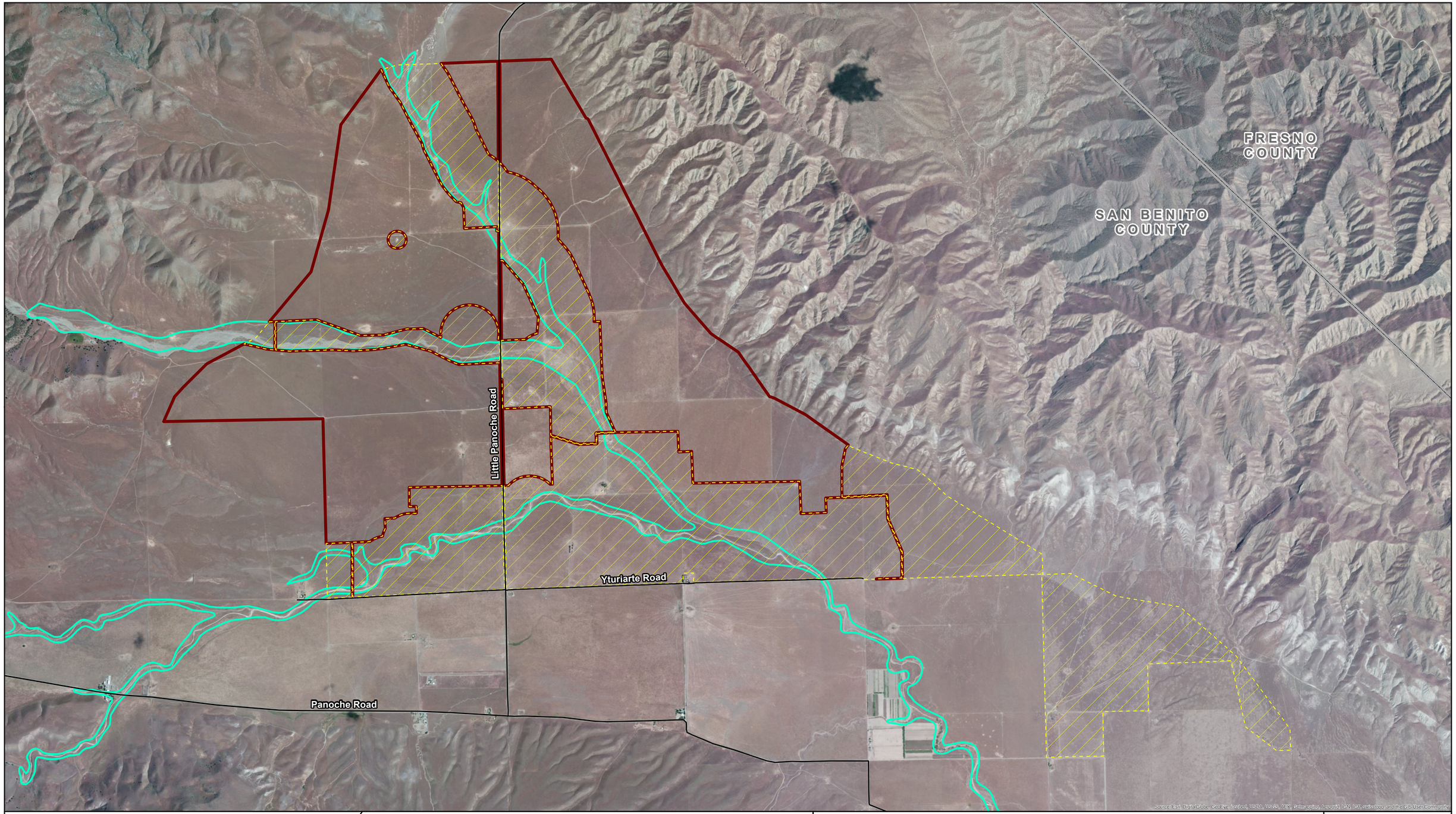
Four individual BNLLs were observed on SCRCL in dry washes during reconnaissance surveys between August 30th and September 3rd, 2010. In addition, focused BNLL surveys were conducted on the SCRCL in September of 2012. Because the abridged protocol-level surveys in 2009 and full protocol-level surveys in 2010 of the VFCL and southern portions of the Project Footprint located all observations of BNLL in or near the washes, the Silver Creek Ranch surveys targeted survey areas on the drainages of the ranch. **Figure 22** shows BNLL detections during these surveys.

BNLL focused surveys were conducted from September 10th through September 17th, 2012 on the SCRCL. Each team of three surveyed drainages with one biologist walking in the drainage and two biologists on either side. Focused BNLL surveys were conducted according to specifications within the BNLL survey protocol except that drainages were targeted and surveys were conducted on September 17th (two days past the protocol dates). However, Dr. Jennings determined that the weather was still warm enough to continue with surveys, as evidenced by incidental BNLL sightings through September 21st, 2012. During BNLL focused surveys, juvenile BNLL were observed within drainages, on hill slopes, and even on top of rocks on top of ridges. In addition, BNLL were incidentally observed during GKR focused surveys from September 11th through September 21st, 2012. The majority of these incidental observations were not associated with a drainage. Thirty-one BNLL were observed during focused surveys for BNLL, and there were 30 incidental BNLL detections during GKR focused surveys. A total of 61 BNLL detections occurred in a two-week period. All BNLL observed were juveniles except for two subadults.

Full Protocol BNLL Surveys

The 2013 BNLL survey (adults, hatchlings, and sub-adults) was conducted on the Project site and portions of the VFCL. Survey methodology was based on the CDFW Approved Survey Methodology for the Blunt-nosed Leopard Lizard (CDFG 2004), the letter "Updated Blunt-nosed Leopard Lizard (BNLL) Survey Methodology" dated May 2, 2013 to CDFW, verbal conversations with Dave Hacker of CDFW and Patrick Golden of Energy Renewal on June 26, 2013, and email correspondence between CDFW and PVS on June 27, 2013.

No BNLL were found within the Project Footprint during the 2013 adult season surveys (May 9 to July 13, 2013). There were a total of 27 observations of BNLL in the VFCL (**Figure 23**) with the majority of the observations associated with the wash habitat along Panoche Creek. Also included on **Figure 23** are



Energy Renewal PARTNERS, LLC

BR
10/21/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Plot Location
- BNLL Observed
- 100-year Floodplain

N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

2010 Blunt-nosed Leopard Lizard Occupancy Sampling Locations

Figure
20

FRESNO COUNTY

SAN BENITO COUNTY

Little Panoche Road

Yturiarte Road

Panoche Road

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Energy Renewal PARTNERS, LLC

BR
10/16/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- 2009 - 2010 BNLL Observation
- 100-year Floodplain

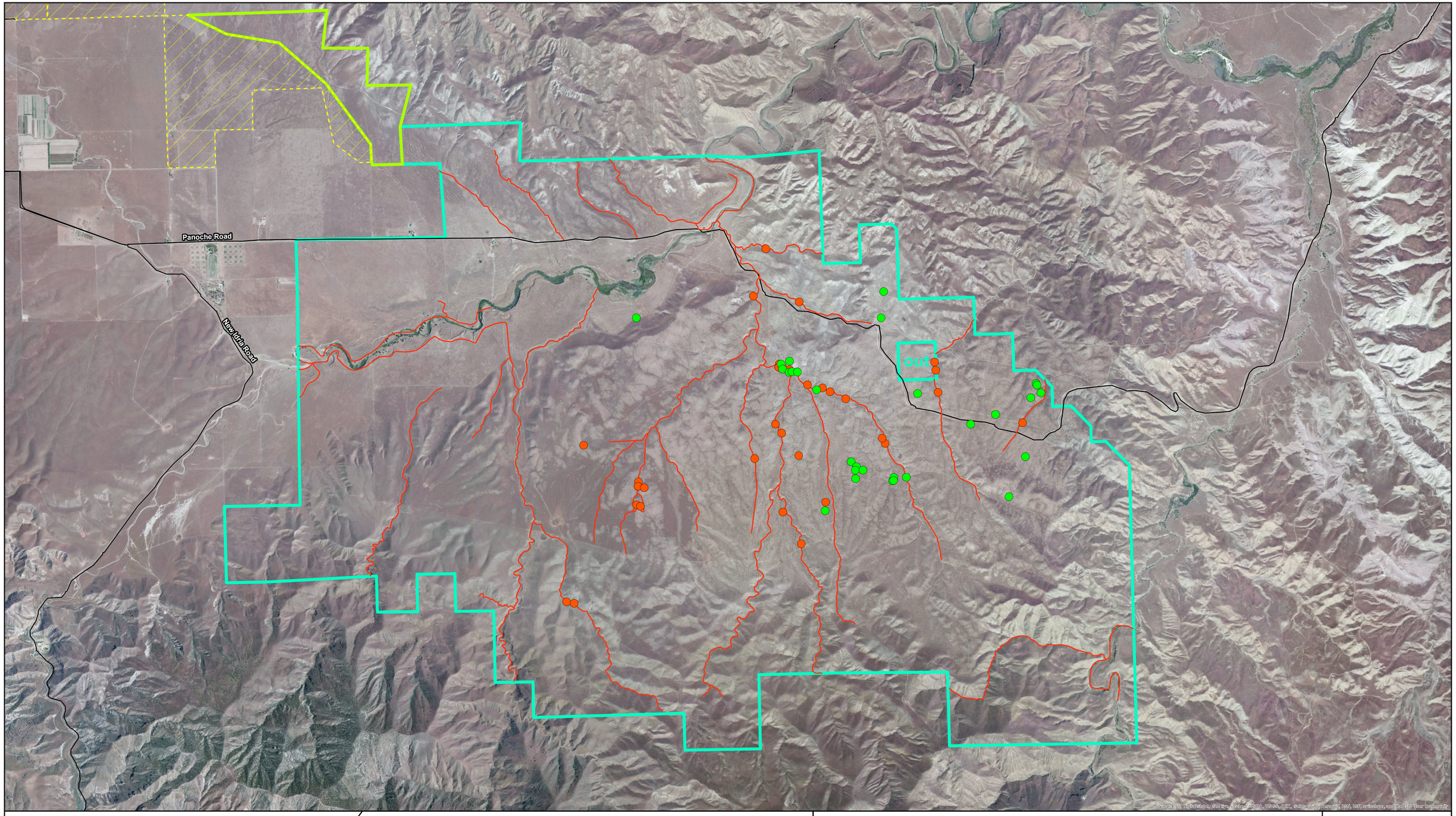
N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

2009-2010 Blunt-nosed Leopard Lizard Observations

Figure
21



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BR
10/21/2013

Legend

- Silver Creek Ranch Conservation Lands
- Valadeao Ranch Conservation Lands
- Valley Floor Conservation Lands
- BNLL Observation During Focused Surveys
- Incidental BNLL Observation
- BNLL Focused Survey Route

N

0 1,500 3,000
Feet

Panoche Valley Solar Project

Blunt-nosed Leopard Lizard Observations on Silver Creek Ranch Conservation Lands

Figure
22

FRESNO COUNTY

SAN BENITO COUNTY

Little Panoche Road

Yturiarte Road

Panoche Road

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Energy Renewal PARTNERS, LLC

BR
10/17/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- 100-year Floodplain
- 2013 Adult BNLL Observation (In Protocol)
- 2013 Adult BNLL Observation (Incidental)
- 2013 Hatchling/Sub-Adult Observation (In Protocol)
- 2013 Hatchling/Sub-Adult Observation (Incidental)

N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

2013 Blunt-nosed Leopard Lizard Protocol Survey Results

Figure
23

the 105 observations of BNLL from previous surveys in 2009 and 2010 (LOA 2010). None of the previous observations are located in the Project Footprint, but are fully located within the VFCL.

The 2013 hatchling and sub-adult season surveys were completed between August 2 and September 10, 2013. There were a total of 13 observations of BNLL made during the surveys (**Figure 23**). A majority of the observations made during the hatchling and sub-adult season surveys were associated with the wash habitat along Panoche Creek in the VFCL (**Figure 23**). However, there was 1 observation of a BNLL hatchling made outside the VFCL. This BNLL hatchling observation was found just north of the VFCL boundary that encompasses Las Aquilas Creek (**Figure 23**). The Project boundaries were modified to avoid this observation (using the 52.4-acre buffer). For information on the rational for the 52.4-acre buffer, see **Appendix E**.

"Decision Rule" Based Habitat Suitability

The entire 2,523 acres of the VFCL were found to be suitable for BNLL. The majority of BNLL observations within the Action Area occurred within the VFCL.

To determine the suitable habitat acreage for BNLL on the VRCL and the SCRCL, two decision rules were used together:

1) A slope analysis was performed, and considering 100 percent of the highly suitable VFCL known to support BNLL are between 0 and 11 percent slope, it was determined that all areas within the same slope range supporting appropriate habitat (i.e., sparse vegetation, friable soils and small mammal burrows) would be considered suitable habitat for the species.

2) Use of a 625-foot buffer around the "rivers" GIS layer. The rivers layer was used due to the fact BNLL were found closely associated to this type of habitat on the VFCL; and 625 feet was the average distance from the center of Panoche Creek to where juvenile BNLL were observed during surveys conducted in 2009 and 2010. This buffer connects most of the 0 to 11 percent slope polygons on the VRCL and the SCRCL and serves as a viable connection between 11 percent slopes as suitable habitat or corridors.

All observations of individual BNLLs on the VRCL were within these areas. Based on this model there are approximately 1,485 acres of suitable habitat for the BNLL on the VRCL. There are at least 7,875 acres of suitable habitat for BNLL on the SCRCL. Although the majority of BNLL observed on the SCRCL were observed within these acres, five BNLL were observed just outside of this area during the focused September 2012 surveys. Therefore, there may be more than 7,875 acres of suitable habitat for BNLL on the SCRCL.

Habitat Suitability Modeling

An HSM was completed in 2010 for portions of the Action Area including the Project Footprint and the VFCL.

The way in which sensitive species such as BNLL use a large area such as the Project site is best framed within a statistical model that, among other things, permits robust estimates of spatial use of the site by BNLL, predicts impacts to the species from full build-out of the PVS, and demonstrates how the Project may affect changes in distribution, other demographic parameters, or use of the site of the site by BNLL over time.

Presence/absence of BNLL were therefore derived from occupancy sampling, full protocol and abridged protocol surveys over certain Sections, and incidental sightings during non-target surveys. The HSM did not use the results of the 2013 full protocol surveys.

Presence or absence inputs of BNLL allowed the use of multiple logistic regression and an information-theoretic approach to build predictive models of BNLL occurrence across the entire Project site. Models were developed to predict the probability of BNLL occurrence as a function of the landscape-scale habitat variables indicated below. Specifying the relationships between BNLL occurrences and a small set of habitat variables required a focus on the parameterization of a single 'global' model, and a spatial model was constructed based on this analysis.

Statistical and spatial models used five landscape-scale habitat predictor variables hypothesized to influence the occurrence of BNLL in the area that includes the Project site:

- Soils - To determine dominant soil types occurring on the site, LOA obtained a soil data layer from NRCS. LOA reclassified this categorical data layer to emphasize the 'river wash' soil type, and compared this type to all other types on the Project site using the statistical model.

- Streams - Within a Geographic Information System (GIS; ArcGIS v9.3.1, ESRI, Redlands, CA), LOA used the USGS National Hydrography Dataset to derive a variable estimating the Euclidean distance to the nearest ephemeral stream or river, which allowed us to capture fine-scale habitats adjacent to these features.

- Slope - LOA used the USGS National Elevation Dataset to estimate slope (in degrees) across the study area.

- Location (Latitude and Longitude) - Because spatial location can serve as a surrogate for unmeasured biotic and abiotic influences on species occurrence, LOA also included coordinates for longitude and latitude in the models. All habitat variables were projected in the same coordinate system and datum (UTM, Zone 10, NAD83) and derived at a 30-meter resolution. Each sampling point was spatially related to the vector of habitat information using an intersect operation in the GIS. Latitude and longitude were considered independent variable for this analysis.

The six parameter global model of BNLL occurrence was >160 AICc units better (i.e., lower) than the intercept-only model, suggesting exceptional approximation of the data. Additional fit statistics were calculated to further evaluate model performance, including Nagelkerke's R-Square (0.82) and a Hosmer and Lemeshow Goodness-of-Fit test (Chi-Square = 11.11, P > 0.196). Classification accuracy for this model was high (ROC=0.97), although each of the above statistics suggested high clustering in the data and a somewhat overfitted model.

Based on Wald Chi-Square values, lower latitudinal values (16.0), closer proximity to river washes (11.5), and river wash soil types (8.6) were the strongest predictors of BNLL occurrence. In addition, higher slopes (7.3) were a reasonably strong negative predictor of occurrence. A weak negative relationship between BNLL occurrence and longitude was also observed (3.6). **Figure 24** shows the Occupancy points over the HSM.

Observed BNLL locations in the VFCL correspond with the HSM produced by the occupancy sampling of 2010 and fall mostly within high suitability habitat with a few in moderately suitable habitat. BNLL are likely to occur along the Panoche and Las Aquilas Creeks' drainages and floodplain; few are likely to occur more than a third of a mile from the floodplain as dispersal events, and it is unlikely that any BNLL

FRESNO COUNTY

SAN BENITO COUNTY

Little Panoche Road

Yturiarte Road

Panoche Road

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BR
11/1/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- 2009 - 2010 BNLL Observation
- High Suitability
- Moderate Suitability
- 2009 - 2010 BNLL Absent
- Low Suitability
- No Data

N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

Blunt-nosed Leopard Lizard Occupancy and Habitat Suitability Model on Project Footprint and Valley Floor Conservation Lands

Figure
24

occur further than a half-mile from the floodplain and drainages, as occupancy sampling of 135 plots did not find BNLL to be present in these areas.

Conservation Land Surveys

Species-specific surveys were not conducted for BNLL on the Valadeao Ranch, and no BNLL were observed during other surveys. Population density cannot be estimated for Valadeao Ranch until surveys have been completed; however, it can be assumed that low areas extending from the Project site onto Valadeao Ranch may be included as suitable habitat for BNLL.

Four BNLL were observed on Silver Creek Ranch, all within the same drainage system, during the 2010 reconnaissance surveys. Sixty-one BNLL were observed during the September 2012 focused BNLL surveys. This species occurs differently on the landscape of Silver Creek Ranch compared to the Project. Because Silver Creek Ranch provides more complex terrain than the Project site, BNLL occur less clumped on the landscape (**Figure 22**). Two ACECs designated by the BLM and cited in the BNLL 5-year Review (2010) as protecting "4,800 acres and 3,800 acres of contiguous blunt-nosed leopard lizard habitat" occur adjacent to and east of the Silver Creek Ranch. These ACECs include terrain and habitat similar to that of the Silver Creek Ranch.

It can be assumed that areas within drainages and areas outside drainages can be included as marginal to suitable habitat for BNLL, because four individuals were located in drainages on Silver Creek Ranch during the 2010 reconnaissance surveys, and 61 BNLL were located both in drainages and away from drainages during the September 2012 focused surveys. Additionally, the two adjacent ACECs support similar terrain and habitat as Silver Creek Ranch.

4.4 California Tiger Salamander

Legal Status

The CTS population segment which may occur within the Project Footprint is currently listed as threatened by the ESA. Two other distinct population segments in Sonoma County and Santa Barbara County are listed as endangered by the ESA. The Santa Barbara County Distinct Population Segment was listed as endangered in 2000. The Sonoma County Distinct Population Segment was listed as endangered in 2002. The remaining population occurs throughout central California, including the Project Footprint. The Central California Distinct Population Segment was listed as threatened in 2004. No Recovery Plan has been written for the CTS to date.

Species Ecology

The CTS was formerly classified as a subspecies of tiger salamander (*Ambystoma tigrinum*), but has since been identified as an individual species (Kraus 1988; Shaffer et al. 1991). They are characterized by a broad head, small eyes, and tubercles on the side of the feet. Coloration is a black back with yellow, cream, or white oval spots or bars. Some individuals may have a prominent cream band on the undersides. Snout-vent length ranges from 7.6 – 12.7 cm, and total length ranges from 15 – 22 cm (Stebbins 1966; 2003).

The CTS originally inhabited most of central California and remains in remnant populations throughout much of its original range. CNDDB records for CTS show its distribution encompasses portions on Alameda, Amador, Calaveras, Contra Costa, Fresno, Kern, Kings, Madera, Mariposa, Merced, Monterey, Sacramento, San Benito, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Tulare, Tuolumne, and Yolo Counties (NatureServe 2009). About

80% of all extant occurrences are in Alameda, Contra Costa, Madera, Merced, Monterey, San Benito, and Santa Clara Counties, with 30% of all occurrences in Alameda County (NatureServe 2009). The use of vernal pools and other temporary bodies of water for breeding limits the CTS to areas of low elevation and low topographic relief throughout their range (Stokes et al. 2008). Ephemeral vernal pools, which refill with water on a yearly basis, that are 40 – 80 cm in depth and have a surface area of 0.2 hectares or more are optimal for breeding CTS; although small, shallower pools will also house breeding CTS (Stokes et al. 2008). Depth of the breeding pool was highly correlated with breeding CTS. Stokes et al. (2008) found no CTS larvae in pools with an average depth of less than 22 cm. Deep pools with permanent water may not be optimal for breeding populations of CTS because they often house predatory fish, crayfish, or bullfrogs that prey upon larval CTS. This creates a narrow range of pool depths where the pool will not completely dry out before CTS have metamorphosed, but also not contain water year round and house predators. Metamorphosed CTS move out of the vernal pools and into upland habitats. Small mammal burrows are important features of upland habitat. Adult CTS occupy small mammal burrows in grassland, savanna, or open woodland habitats (Trenham and Shaffer 2005).

Activity patterns of adult CTS are not well understood. Adult CTS live their entire lives in the burrows of small mammals such as the California ground squirrel. Adults begin moving toward breeding pools when the first fall rains begin to inundate pools. Breeding adults will continue moving to pools through the winter and spring. Adults can generally be found at breeding pools from October through May, although breeding is highly dependent on the amount of precipitation (Trenham et al. 2001; Trenham and Shaffer 2005). Adult CTS leave the breeding pools in late spring and return to upland habitats. Trenham and Shaffer (2005) used pitfall traps at various intervals away from a pool to determine the extent of upland use. They found that the numbers of adult CTS declined as distance from the pool increased out to 620 meters. Subadults also moved up to 600 meters away from the pools, but most were concentrated between 200 and 600 meters from the pool. This has led managers to suggest preserving upland habitats with suitable small mammal burrows out to 600 meters from breeding pools (Trenham and Shaffer 2005).

CTS may take upward of four to five years to reach sexual maturity (Trenham et al. 2000). Although individuals can live upward of ten years, less than 50% of individuals breed more than once (Trenham et al. 2000). Rainfall can significantly alter adult breeding pool attendance, and production of metamorphs tends to be a boom-or-bust scenario (Loredo and Van Vuren 1996). Typically, greater numbers of breeding adults return to pools during years with greater rainfall (Trenham et al. 2000; 2001; Cook et al. 2006; Stokes et al. 2008). Males are often the first to arrive at breeding pools and remain in the pool longer than females (Trenham et al. 2000). Larvae remain in the pools approximately four months and emigrate from the pools as they dry. Metamorph emigration typically occurs throughout May and is directly related to the pool drying date (Trenham et al. 2000).

Amphibian populations are often used as an example for the metapopulation/source-sink models. The CTS populations at different breeding pools often act in a metapopulation fashion (Trenham et al. 2001). Mark – recapture studies found that while most breeding adults return to their natal pool, 22% dispersed to different ponds (Trenham et al. 2001). It should be noted that Trenham and Shaffer (2005) did not capture any CTS, adult or subadult, more than 620 meters from the pool. Thus, pools more than 1,240 meters from one another may limit dispersal. Breeding CTS have been known to use artificially created pools, and the creation of pools in a stepping-stone fashion has been suggested to aid dispersal between populations (Stokes et al. 2008).

The diet of larval and metamorphosed CTS is not well studied. Studies on the diet of other larval *Ambystomids* have found that less developed larvae prey mainly on zooplankton, and larger, more developed larvae prey on amphipods, mollusks, and insect larvae as well as zooplankton (Dodson and Dodson 1971; Hoff et al. 1985; McWilliams and Bachmann 1989). Adult diet consists of terrestrial

invertebrates such as earthworms, snails, and other insects. Vertebrates, such as small mammals and fish, may be taken as well (Stebbins 1959; NatureServe 2009).

CTS populations are negatively affected by predatory fish and amphibian populations. Mosquitofish (*Gambusia* sp.), smallmouth bass (*Micropterus dolomieu*), green sunfish (*Lepomus cyanellus*), and bullfrogs (*Rana catesbiana*) are common predators of CTS larvae and adults (NatureServe 2009). Yearly drying of vernal pools used for breeding greatly reduces the numbers of these potential predators; however, heavy spring and winter rains can connect pools to other permanent water sources and introduce CTS predators.

Local Distribution

Population centers for the Central California Distinct Population Segment identified by the USFWS include the Central Valley Region, Southern San Joaquin Region, East Bay Region, and Central Coast Region. San Benito County falls in the East Bay Region. Fresno County falls in the Southern San Joaquin Valley Region. The CNDDB has records of the CTS occurring in Cerro Colorado (1992), Mercey Hot Springs (1992), Ortigalita Peak (1992), Rock Springs Peak (1999), Ruby Canyon (1993), San Benito (2003), and Topo Valley (2000) USGS quads (**Figure 25**). The years in parenthesis represent the most recent CNDDB documented occurrence in each quad.

CTS larvae were observed in two off-site ponds (Ponds #3 and #12; **Figure 25**) during the 2009-2010 rainy season while conducting protocol-level vernal pool branchiopod surveys (**Table 21**). Pond #3 is a large stock pond that still contained sufficient water level for complete metamorphosis of CTS larvae by May 21st. Seven large CTS larvae were netted at this location. Pond #12 is a vernal pool where small CTS larvae were first observed in February during branchiopod surveys. During the May 21 sampling event, there were several dozen larvae in the pond attempting to metamorphose (due to the drying of the pond). Some may have metamorphosed successfully, though 10 were observed desiccated in the shallow and muddy portions of the pond. Such conditions make these larvae susceptible to avian predation. Protocol CTS Larval Surveys, performed in March, April, and May of 2010, also noted larval CTS in these two ponds. CTS were not observed in the two historic ponds (Ponds #8 and #9) during these protocol larval surveys.

TABLE 21 PONDS SURVEYED DURING PROTOCOL CTS LARVAL SURVEYS, MARCH, APRIL, AND MAY 2010

LOCATION #	HABITAT TYPE	FINDINGS	DRY BY DATE
01	Stock Pond	Clam Shrimp	Still Hydrated 21 May
02	Old Stock Pond	None	21 May (completely dry)
03	Stock Pond	CTS Larvae	Still Hydrated 21 May
04	2 Stock Ponds	None	21 May (completely dry)
05	Old Stock Pond	None	12 April (completely dry)
06	Stock Pond	None	21 May (completely dry)
07	2 Old Stock Ponds	None	21 April (almost dry)
08	Ephemeral Pool Complex	None	21 May (only 1 pool hydrated)
09	3 New Stock Ponds	None	21 May (only 2 pools hydrated)
10	Ephemeral Pool Complex	None	21 May (completely dry)
11	Old Stock Pond	None	Still Hydrated
12	Stock Pond	CTS Larvae	Drying fast 21 May

6,336' buffer
2,640' buffer
2,100' buffer
6,336' buffer
2,640' buffer
2,100' buffer
Panoche Road
Little Panoche Road
FRESNO COUNTY
SAN BENITO COUNTY
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Legend

- Project Footprint
- Valley Floor Conservation Lands
- Valadeao Ranch Conservation Lands
- Silver Creek Ranch Conservation Lands
- Known CTS Breeding Pond
- CTS Pond Buffer

N

0 1,000 2,000 4,000
Feet

Panoche Valley Solar Project

Known California Tiger Salamander Breeding Ponds Outside Project Footprint and Valley Floor Conservation Lands

Figure
25

No CTS breeding were observed in the Project Footprint during the 2009-2010 rainy season. However, breeding was confirmed in the two nearby, but off-site ponds discussed above. CTS breeding in those ponds could estivate on portions of the Project site, as discussed below in **Section 5.4**. While aquatic life was devoid in Ponds #8 and #9 during that same rainy season (2009 to 2010), these two pond areas supported historic breeding for CTS in 1992, and thus will be treated as known breeding ponds for this analysis.

4.5 California Condor

Legal Status

The California condor (CACO) is currently listed as endangered by the ESA. The CACO was originally listed as being in danger of extinction under the Endangered Species Preservation Act of 1966 (32 FR 4001, March 11, 1967) and is currently listed as endangered under the ESA of 1973, as amended. As of October 2008 the total population of CACO was 327, with 162 of those in captivity (Natureserve). Approximately 574,400 acres of critical habitat have been designated in Ventura, Los Angeles, Santa Barbara, San Luis Obispo, Kern, and Tulare Counties. The *California Condor Recovery Plan Third Revision* was published in April of 1996 (USFWS 1996).

Species Ecology

The CACO is the largest soaring bird in North America and one of the largest flying birds in the world. It has a wingspan of 2.8 meters and a broad, wedge-shaped tail. The sexes appear similar, but there is a slight difference in mass, with males averaging 8.8 kilograms (kg), and females averaging 8.1 kg (Snyder and Schmitt 2002). Adult birds are generally black, with mostly bald heads and necks. The bill is long, hooked at the end, and enveloped with flesh along the majority of its length. A feathered ruff is located at the base of the neck into which the neck and lower head can be withdrawn in order to warm the bird. White feathers of the underwing coverts and white tips on the upperwing coverts produce an elongated triangle on the leading half of the wing undersides and a white bar on the upperwing, respectively. Mature birds possess brightly colored heads and necks, which range from yellow to red on the head and gray to yellow on the neck. The front of the neck just above the ruff is a deep red color that can vary in intensity depending on the mood of the bird. Air sacs located under the brightly-colored regions can be inflated during antagonistic or reproductive displays. During hot weather, their legs are often white with excrement, as the evaporating waste functions to cool the bird by a process known as urohydrosis (Sibley 2001).

Prehistorically, the CACO ranged over much of the southern United States from Baja California to Florida. Fossils have even been reported from as far north as New York (Steadman and Miller 1987). The disappearance from much of its range occurred 10,000 – 11,000 years ago, coinciding with the late Pleistocene extinction of North American megafauna (USFWS 1996). By the time of European settlement in western North America, the CACO occurred only in a narrow strip along the Pacific Coast from British Columbia, Canada to Baja California, Norte, Mexico. Their range shrunk rapidly until 1987, when the last free flying individual was caught, the CACO only occupied a wish-bone shaped area overlaying nine California counties: Los Angeles, Ventura, Santa Barbara, San Luis Obispo, Monterey, San Benito, Fresno, Kern, and Tulare Counties. Since capturing the last wild individual in 1987, a captive breeding program has led to the re-release of the CACO back into the wild. Individuals have been released in southern California, Arizona around the Grand Canyon, and the Baja Peninsula of Mexico. Currently, there are four active release sites in California, one in Arizona and one in Mexico.

The CACO is a habitat generalist, nesting in areas as diverse as chaparral and snow-covered montane forests. Nesting sites typically occur in cliff cavities, large rock outcrops, and large trees. Roosting sites

are usually nearby (Snyder and Schmitt 2002, USFWS 1996). Both types of sites require isolation from human disturbance. Foraging tends to occur in relatively open foothill grasslands and oak savannah habitats, somewhat separate from nesting habitat. Occasionally densely vegetated areas may be used and possibly even in chaparral and forest, though this has not been frequently observed. The CACO locates its food by sight, not olfactory receptors, so open areas with little brush to conceal carrion are required. The CACO requires sufficient food availability, open habitat to locate and reach food sources, and consistent thermal wind patterns for soaring. Because of their large mass, condors tend to only flap their wings during takeoff and landing, meaning that foraging usually only occurs when there are winds strong enough to sustain flight during the activity.

The CACO feeds primarily on mammalian carrion, and occasionally on the remains of reptiles and birds. In recent years this diet has ranged from large to relatively small prey and has included domestic animals, mule deer (*Odocoileus hemionus*), coyotes (*Canis latrans*), ground squirrels (*Spermophilus* spp.), common gray foxes (*Urocyon cinereoargenteus*), long-tailed weasels (*Mustela frenata*), kangaroo rats (*Dipodomys* sp.), and Botta's pocket gophers (*Thomomys bottae*) (Snyder and Schmitt 2002; USFWS 1996). Various types of shells have also been found in CACO nests. Historically, CACO populations in coastal areas consumed fish and marine carrion as well, though those do not appear to be a very common food source anymore. Condors generally soar several hundred meters above the ground and watch for other scavengers in order to locate carcasses. They will then circle over the carcass, likely to guide other condors to the food source (USFWS 1996), before landing and subsequently taking the carcass from smaller species. If golden eagles are present, condors will typically wait until the eagles leave, rather than engage them. Fresh carrion is preferred, though the birds will occasionally feed on decayed carcasses, depending on food availability. The CACO is believed to feed only one to three days per week, though this may differ seasonally or by individual.

Pair formation generally begins in December and lasts throughout spring. Once a pair forms, they will remain together year-round for multiple years. Several weeks prior to egg-laying, a network of alternate nest sites are visited until one is selected by the female. Nest investigations consist of the pair entering the site and spending several hours moving organic substrate about with their bills and feet in the area where egg-laying will occur (Snyder and Schmitt 2002). Different nest sites are used by the pair from year to year (Snyder and Sibley 1986), which may be an adaptation to reduce parasite infestation (Snyder and Schmitt 2002). The network of nest sites used by a single pair may be distributed over an area many miles in diameter. After females select a suitable nest, they lay a single egg (averaging 281 grams), usually between early January and early April (Snyder and Schmitt 2002). Incubation is a cooperative "tag-team" effort between parents and lasts from 53 to 60 days (Snyder and Schmitt 2002), resulting in the hatching of a white downy chick with open eyes.

Nestlings are brooded by both parents almost constantly for the first two weeks, after which there is a rapid decline until only erratic night-brooding occurs from about one month of age (Snyder and Snyder 2000). During the initial two-week period, parents invest a large amount of time feeding, grooming, and inspecting their young when not brooding. Feeding, like all other parental duties, is performed by both parents and is accomplished by regurgitation (Snyder and Snyder 2000). After one month of age, attendance by parents declines substantially to stabilize at a level that will be maintained until fledging occurs at approximately six months of age. Post-fledging care by parents lasts approximately six months and consists of intermittent feedings with ever-growing time lapses between each occurrence. This prolonged parental care is most likely the reason that condors do not breed annually on a regular basis. Fledglings are considered fully independent when able to successfully compete with other species normally displaced by mature individuals during feeding.

The CACO usually occupies traditional roosting sites until mid-morning and return to the same roosting sites in mid- to late-afternoon. However, it is not unusual for a CACO to remain on a roost for an entire

day. Cliffs and tall conifers, including dead snags, are generally utilized as roost sites. Studies performed during the 1980s showed that the CACO was capable of making extremely long daily flights. Mature condors tended to travel shorter distances than immature condors. Paired nesting individuals rarely traveled more than 70 km (44 miles) from their nest site. The longest recorded flight during a single day was by an immature male and was 225 km (141 miles; Meretsky and Snyder 1992). The CACO uses thermal patterns created by topography for flights. High wing loading values allow the CACO to remain aloft for long periods of time while expending little energy; however, favorable winds and thermals are required for extended foraging flights. Foothills and mountainous terrain create the most favorable wind and thermal conditions. The CACO is rarely observed over large flat areas.

The CACO rarely falls prey to other predators; however, golden eagles, ravens, coyotes, and black bears (*Ursus americanus*) have been known to take CACO chicks and eggs in the past (Snyder 1986). Perhaps the largest known killer of the CACO in recent times is the ingestion of lead from unrecovered game animals and gut piles (Fry 2003, Parish et al. *in press*).

Local Distribution

One of the active CACO release sites is located at Pinnacles National Monument in the Gabilan Mountains of San Benito County. Pinnacles National Monument is located approximately 16 flight miles southwest of the Project Footprint. In 2007, this population stood at 12 individuals. No critical habitat for the CACO has been designated in San Benito County. The CNDDB has no records of the CACO in San Benito County, even though Pinnacles National Monument is an active release site in the county.

No suitable nesting habitat exists on the Project Footprint. Although possible foraging habitat may exist on the Project Footprint and Conservation Lands, the CACO has not been observed during other biological surveys on-site (including ongoing golden eagle/raptor use surveys). According to the USFWS, radio-tracking surveys of released CACO have identified CACO occurring over the Action Area while in flight, likely while foraging.

Aerial nest surveys targeting nesting golden eagles did not identify any potential CACO nests within ten miles of the Project Footprint.

4.6 Vernal Pool Fairy Shrimp

Legal Status

The VPFS is currently listed as threatened by the ESA. The VPFS was listed under the ESA on September 19, 1994. On February 10, 2006 the USFWS designated 858,846 acres (347,563 hectares) of critical habitat for four vernal pool crustaceans (including the VPFS) and 11 vernal pool plants. The VPFS does not have its own recovery plan, but is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

Species Ecology

The VPFS are distinguished from other fairy shrimp by the presence and size of several mounds on the male's second antennae and by the female's short, pyriform brood pouch. VPFS are typically a translucent off-white to grey and vary in size from 11 to 25 mm (0.4 to 1.0 inch) in length (Eng et al. 1990). Locomotion is obtained by swimming through the water column on their backs and using paddle-like feet that also function as gills (USFWS 2005; Wildlands, Inc. 2004).

The VPFS was first described to science in 1990, although it had been collected and misidentified as a Colorado fairy shrimp as early as 1941 (Eng et al. 1990, USFWS 2005). Given the VPFS' late description to science, information on its historical distribution is limited. However, the VPFS is currently known to occur in a wide range of vernal pool habitats in the southern and Central Valley regions and coastal ranges of California and in two vernal pool habitats in the Agate Desert region of southern Oregon (USFWS 2005). The historical range of the VPFS most likely was similar to the historical distribution of vernal pools across California. As such, the historical distribution was likely similar to the current distribution, although less habitat is available than historical levels. The VPFS is one of the most widely distributed fairy shrimps in California, but is uncommon throughout its range and rarely abundant when it does occur (Eng et al. 1990).

Helm (1998) found VPFS in 21 different types of habitat, including vernal pools, vernal swales, alkaline pools, and road-side ditches. Optimal pools tend to be a neutral to slightly alkaline pH, have low dissolved salts, and are dominated by native vernal pool plants. VPFS can occur in pools as large as 10 hectares (25 acres), but most occur in much smaller pools measuring less than 0.02 hectares (0.05 acres; Gallagher 1996, Helm 1998). Helms (1998) found the average depth of pools containing VPFS to be 15 cm, with an average maximum depth of 22 cm. Optimal pools tend to be a neutral to slightly alkaline pH, have low dissolved salts, and are dominated by native vernal pool plants. The common thread between all types of habitat is that they dry out during the summer and fall. The eggs, or cysts, of VPFS require a drying and inundation cycle to trigger hatching. If the cysts do not dry out, a fungal infection can occur, killing the cyst.

Once hatched, VPFS can mature to adulthood in as little as 14 days, given the optimal water temperature (Gallagher 1996). Helm (1998) observed VPFS mature to adulthood in 18 days following a late-October rain followed by mild weather and water temperatures at 15˚C. Time to maturation varies greatly with water temperature. Warmer water temperatures increase the maturation process, but cooler water temperatures are necessary for cyst hatching. Helm (1998) observed that the mean time to reproduction was 39.7 days, and the mean population longevity was 90.6 days; although one population lasted 139 days. The VPFS is typically a univoltine species (one generation per year); however, different generations may be present in a single wet season if a pool partially dries out, leaving the upper banks dry and then re-inundates (Helm 1998, USFWS 2005, Yolo Natural Heritage Program 2009).

VPFS forage on bacteria, protozoan, algae, rotifers, and bits of detritus. Vernal pool branchiopods in general provide a major foraging source for migrating waterfowl and shorebirds. Mallard (*Anas platyrhynchos*), green-winged teal (*A. crecca*), bufflehead (*Bucephala lbeola*), greater yellowlegs (*Tringa melanoleuca*), and killdeer (*Charadrius vociferus*) all forage actively on vernal pool branchiopods during spring migrations (Yolo Natural Heritage Program 2009). Western spadefoot (*Spea hammondii*) bullfrog (*Lithobates catesbeianus*), mosquitofish (*Gambusia affinis*), and vernal pool tadpole shrimp (*Lepidurus packardi*) also forage on VPFS.

Mobile predators, such as waterfowl and shorebirds, can expel viable cysts in their excrement, thus aiding in the dispersal of VPFS. VPFS also disperse in high water events that can temporarily interconnect adjacent pools.

Local Distribution

The 2005 USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* only notes two locations of VPFS populations in San Benito County. The CNDDB has records of the VPFS occurring in Topo Valley (1989) USGS quad. No critical habitat for the VPFS has been designated in San Benito County.

One-hundred and twenty-one (121) ephemeral pools were identified within the Project Footprint, which were classified as ephemeral drainages within seasonal drainages (50 features; 1.88 acres), road puddle or roadside ditch (36 features; 0.22 acres), stock pond (5 features; 0.34 acres), trough puddles that were created by livestock around leaky troughs (15 features; 0.13 acres), and vernal pools (15 features; 0.26 acres; **Figure 26**).

The winter 2010 Protocol Vernal Pool Branchiopod Surveys identified VPFS within the Action Area in one pool, a small berm pond located along the boundary of Sections 4 and 9. One other pool, created by excavated dirt used for the berm around the occupied pool, was identified as hydrologically connected with the VPFS occupied pool. VPFS were not found in any other potential habitat throughout the project site or the VRCL (**Figure 27**).

4.7 Conservancy Fairy Shrimp

Legal Status

The CFS is currently listed as endangered by the ESA. It is not listed by the California Endangered Species Act (Fish and Game Code §§ 2050 *et seq*). The CFS was listed under the ESA on September 19, 1994. On February 10, 2006 the USFWS designated 858,846 acres (347,563 hectares) of critical habitat for four vernal pool crustaceans (including the CFS) and 11 vernal pool plants. The CFS does not have its own recovery plan, but is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

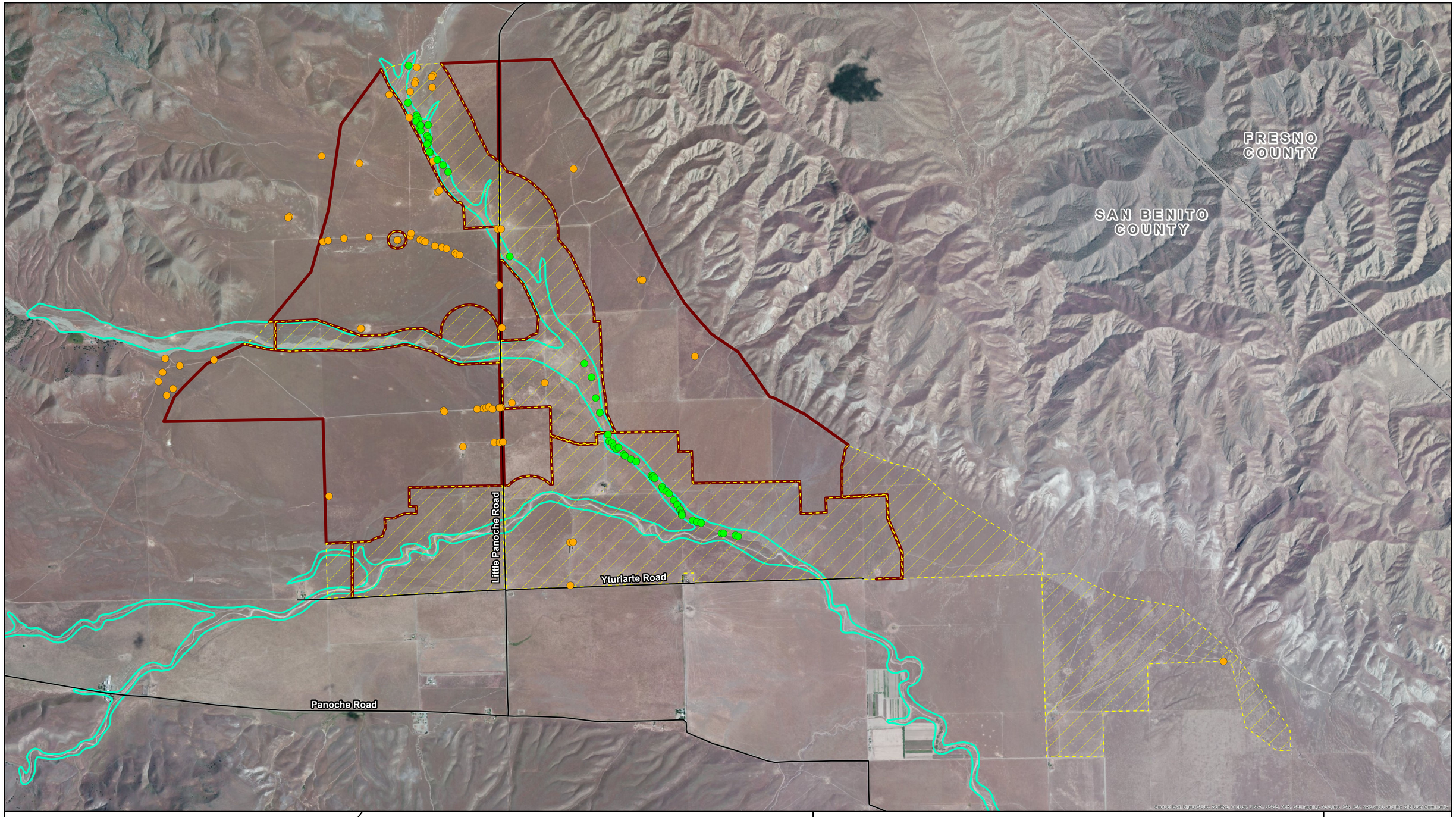
Species Ecology

The CFS is distinguished from other fairy shrimp by variations to the male's second antennae and the female's brood pouch. The distal segment of the male's second antennae is about 30% shorter than the basal segment, and the tip is bent medially about 90˚. The female's brood pouch is tapered at each end and typically extends to the eighth abdominal segment (Eng et al. 1990). Mature CFS are 14 to 27 mm (0.6 to 1.1 inches) in length. The CFS is typically off-white to grey, although the brood pouch may be green or yellow. Locomotion is obtained by swimming through the water column on their backs and using paddle-like feet that also function as gills (USFWS 2005).

The CFS was first described to science in 1990, although the specimens used in identification were collected in 1982 (Eng et al. 1990). Information on the historical distribution of CFS is limited, however it is likely that the species once occupied suitable vernal pool habitat throughout the Central Valley and southern coastal regions of California. The CFS is currently known from a few isolated populations over a large portion of the Central Valley from Tehama, Butte, Solano, Glenn, Yolo, Merced, Stanislaus, and Ventura Counties.

Suitable habitat for the CFS includes vernal pools, alkaline pools, and vernal lakes (Helm 1998). Occupied pools ranged from 30 square meters (m^2) to 356,253 m^2. Occupied pools averaged 27,865 m^2 (299,865 square feet (ft^2)), which is larger than the average pool size of all other endemic California branchiopods. Pool depth ranged from 10 to 40 cm with an average of 23.1 cm. Other habitat characteristics include low alkalinity, low total dissolved solids, a pH near 7, and being dominated by native vernal pool plants (USFWS 2005). The common thread between all types of habitat is that they dry out during the summer and fall. The eggs, or cysts, of VPFS require a drying and inundation cycle to trigger hatching. If the cysts do not dry out, a fungal infection can occur, killing the cyst.

Once hatched, CFS can mature to adulthood in an average of 46 days, although reproduction has been observed in as little as 19 days in optimal water conditions. All CFS observed in this instance died once



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Legend

- Project Footprint
- Valley Floor Conservation Lands
- Vernal Pool within 100-year Floodplain (56)
- Vernal Pool outside 100-year Floodplain (71)
- 100-year Floodplain

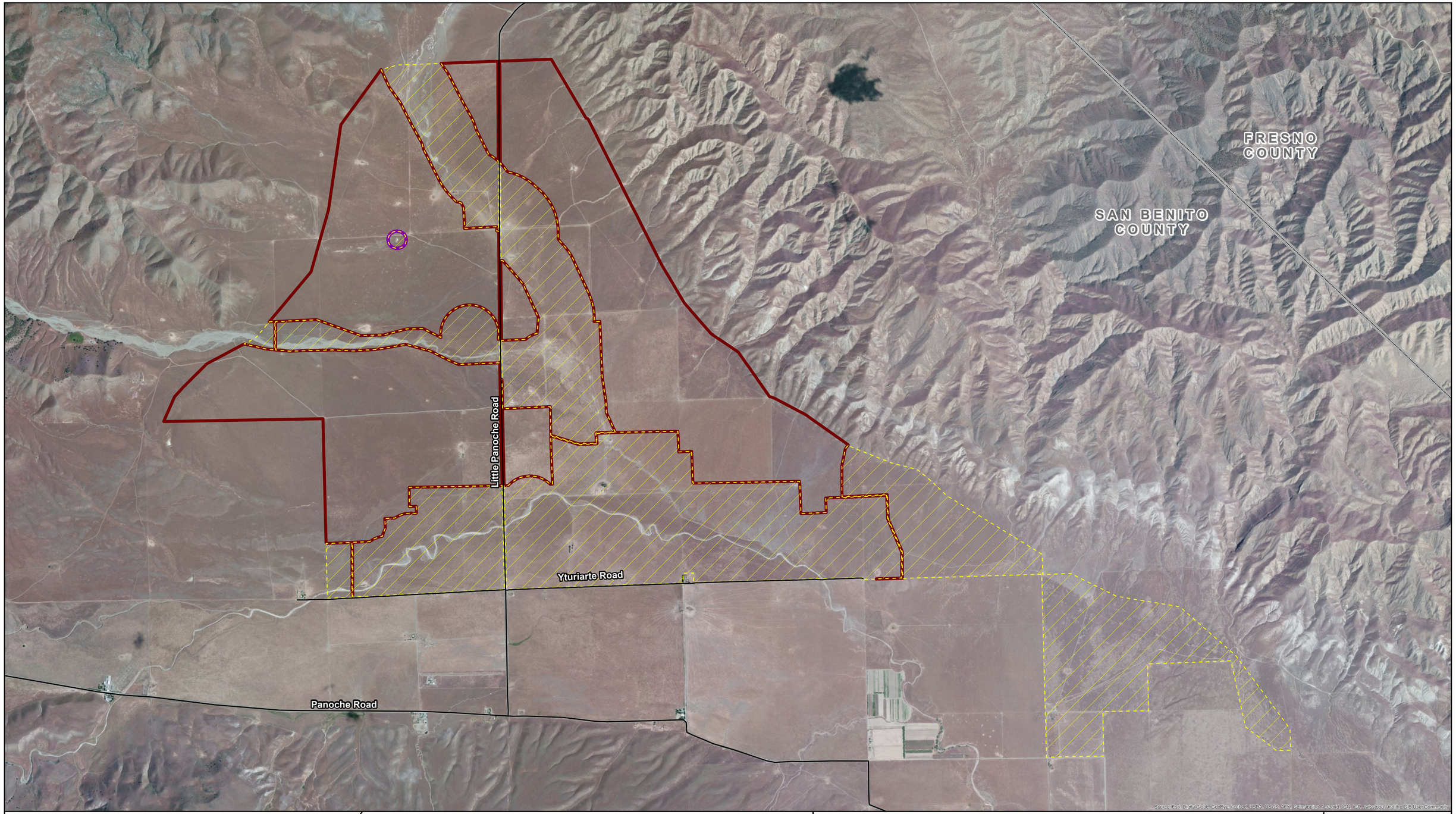
N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

Ephemeral Pool Habitat Locations

Figure
26



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10/15/2013

Legend

- Project Footprint
- Valley Floor Conservation Lands
- Vernal Pool Fairy Shrimp Observations

N

0 625 1,250 2,500
Feet

Panoche Valley Solar Project

Vernal Pool Fairy Shrimp Observations

Figure
27

the water temperature reached a steady 25˚C. CFS may live as long as 154 days (Helm 1998). Time to maturation varies with water temperature. The CFS is typically a univoltine species (one generation per year); however, different generations may be present in a single wet season if a pool partially dries out, leaving the upper banks dry and then re-inundates (Helm 1998, USFWS 2005, Yolo Natural Heritage Program 2009).

CFS forage on bacteria, protozoan, algae, rotifers, and bits of detritus. Vernal pool branchiopods in general provide a major foraging source for migrating waterfowl and shorebirds. Mallard, green-winged teal, bufflehead, greater yellowlegs, and killdeer all forage actively on vernal pool branchiopods during spring migrations (Yolo Natural Heritage Program 2009). Western spadefoot, bullfrog, mosquitofish, and vernal pool tadpole shrimp also forage on CFS.

Mobile predators, such as waterfowl and shorebirds, can expel viable cysts in their excrement, thus aiding in the dispersal of CFS. The CFS also disperse in high water events which can temporarily interconnect adjacent pools.

Local Distribution

The 2005 USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* does not note any extant populations of CFS in San Benito County. The CNDDB has no records of CFS occurring in the Project Footprint or on USGS quads or the encompassing quads. No critical habitat for CFS has been designated in San Benito County.

No CFS were observed on the project site or the VFCL and VRCL during winter 2010 Protocol Vernal Pool Branchiopod Surveys.

4.8 Longhorn Fairy Shrimp

Legal Status

The LHFS is currently listed as endangered by the ESA. It is not listed by the California Endangered Species Act (Fish and Game Code §§ 2050 *et seq*). The LHFS was listed under the ESA on September 19, 1994. On February 10, 2006 the USFWS designated 858,846 acres (347,563 hectares) of critical habitat for four vernal pool crustaceans (including the LHFS) and 11 vernal pool plants. The LHFS does not have its own recovery plan, but is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

Species Ecology

Male LHFS are easily distinguished from other fairy shrimp by the very long second antennae, which is about twice as long, relative to its body size, as the second antennae from other species. Females can be distinguished by their cylindrical brood pouch which extends below abdominal segments six and seven. Mature adults range from 12 to 21 mm (0.3 to 0.4 inches) in length. Locomotion is obtained by swimming through the water column on their backs using paddle-like feet that also function as gills (USFWS 2005).

The LHFS was first described to science in 1990, although specimens were collected as early as 1937 (Eng et al. 1990). Given the late description to science, information on the historical distribution of LHFS is limited. It is surmised that the species does not extend into the northern portion of the Central Valley or into southern California, based on extensive surveys in southern California, and because the northern Central Valley may not reach the necessary temperatures for maturation. Currently the LHFS is

extremely rare and only known from eight distinct populations in San Luis Opisbo, Merced, Contra Costa, and Alameda Counties (USFWS 2005).

Helm (1998) surveyed 4,008 vernal pools, and similar habitats, for fairy shrimp. Only four pools contained LHFS. Habitat that contained LHFS in Helm's study included alkaline pools and rock outcrop pools. Pools which contained LHFS ranged from 4.6 to 2,788 m^2 (49 to 30,009 ft^2) and averaged 678 m^2 (1,195 ft^2). Pool depths ranged from 10 to 40 cm (3.93 to 15.75 inches) and averaged 23.1 cm (9.09 inches). Other characteristics of pools with extant populations include a pH near neutral, and temperatures ranging from 10 to 28˚ C. The common thread between all types of habitat is that they dry out during the summer and fall. The eggs, or cysts, of VPFS require a drying and inundation cycle to trigger hatching. If the cysts do not dry out, a fungal infection can occur, killing the cyst.

Time to maturation and time to reproduction is currently unknown. The LHFS is typically a univoltine species (one generation per year); however, different generations may be present in a single wet season if a pool partially dries out, leaving the upper banks dry and then re-inundates (Helm 1998, USFWS 2005). The LHFS has been found in the same general areas as CFS, VPFS, California fairy shrimp (*Linderiella occidentalis*), and versatile fairy shrimp (*Branchinecta lindahli*; Eng et al 1990, Eriksen and Belk 1999).

LHFS forage on bacteria, protozoa, algae, rotifers, and bits of detritus. Vernal pool branchiopods in general provide a major foraging source for migrating waterfowl and shorebirds. Mallard, green-winged teal, bufflehead, greater yellowlegs, and killdeer all forage actively on vernal pool branchiopods during spring migrations (Yolo Natural Heritage Program 2009). Western spadefoot, bullfrog, mosquitofish, and vernal pool tadpole shrimp also forage on LHFS.

Mobile predators, such as waterfowl and shorebirds, can expel viable cysts in their excrement, thus aiding in the dispersal of LHFS. LHFS also disperse in high water events that can temporarily interconnect adjacent pools.

Local Distribution

The 2005 USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* does not note any extant populations of LHFS in San Benito County. The CNDDB has no records of LHFS occurring in the Project Footprint or the encompassing USGS quads. No critical habitat for LHFS has been designated in San Benito County.

No LHFS were observed on the project footprint or Valley Floor and VRCL during the winter 2010 Protocol Vernal Pool Branchiopod Surveys.

4.9 Vernal Pool Tadpole Shrimp

Legal Status

The VPTS is currently listed as endangered by the ESA. It is not listed by the California Endangered Species Act (Fish and Game Code §§ 2050 *et seq*). The VPTS was listed under the ESA on September 19, 1994. On February 10, 2006 the USFWS designated 858,846 acres (347,563 hectares) of critical habitat for four vernal pool crustaceans (including the VPTS) and 11 vernal pool plants. The VPTS does not have its own recovery plan, but is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

Species Ecology – The VPTS is identified by a large, shield-like carapace that covers the anterior half of the body. They have 30 to 35 pairs of phyllopods, a segmented abdomen, and paired cercopods or tail-

like appendages. When seen from above, the carapace and cercopods give the VPTS the appearance of a tadpole. Mature VPTS range from 15 to 86 mm (0.6 to 3.3 inches; USFWS 2005). VPTS are typically green, but coloration may vary from clear to tan, depending on water clarity (Yolo Natural Heritage Preserve 2009).

The VPTS is an extremely old species which has remained relatively unchanged over the last two million years. From the end of the Pleistocene until the mid-1800s most of California's Central Valley contained extensive seasonal wetlands, which may have periodically covered the entire valley (Oakeshott 1978). Historically, VPTS was probably distributed throughout these wetlands of the Central Valley and Central Coast regions, but did not range outside the Central Valley (USFWS 2005). Currently the VPTS is distributed across the Central Valley and into the San Francisco Bay area. The extant populations are known from Shasta, Butte, Tehama, Sacramento, Yuba, Placer, Solano, Glenn, Merced, Tulare, Kings, Fresno, Stanislaus, Madera, Sutter, Fresno, and Alameda Counties (USFWS 2005, Yolo Natural Heritage Program 2009). However, the VPTS is considered rare throughout the remaining vernal pool habitat in its range. Helm (1998) found VPTS in only 17% of vernal pools sampled.

Helm (1998) found VPTS in 17 different types of habitat, including alkaline pools, vernal pools, vernal swales, ditches, road ruts, and stock ponds. Average occupied pool size was 1,828 m^2. Occupied pool depth ranged from two to 151 cm, with an average of 15.2 cm. Optimal pools are neutral to slightly alkaline, clear, low in dissolved solids, and dominated by native vernal pool plants. The common thread between all types of habitat is that they dry out during the summer and fall. The VPTS was able to withstand water temperature as high as 32˚C, and only died when their pools dried. The eggs, or cysts, of VPFS require a drying and inundation cycle to trigger hatching. If the cysts do not dry out, a fungal infection can occur, killing the cyst. However, cysts can hatch during the wet season without the pool drying out.

Once hatched, VPTS can mature to adulthood in as little as 25 days, given optimal water temperature (Helm 1998). Helm (1998) observed the mean time to reproduction of 54 days, with a minimum of 41 days. Tolerance of higher water temperatures may explain why the VPTS has one of the longest life spans of vernal pool crustaceans. Mean population longevity was 143.6 days, and maximum longevity was 168 days (Helm 1998). Unlike other vernal pool crustaceans, VPTS eggs do not require a dry period before hatching, although they do require inundation. Multiple generations may occupy one pool. Females could deposit as many as six clutches of eggs in a single wet season.

VPTS are omnivorous with a strong preference for animal matter. Live invertebrates, amphibian larvae, carrion, and detritus filtered from the water column make up the VPTS diet.

Vernal pool branchiopods in general provide a major foraging source for migrating waterfowl and shorebirds. Mallard, green-winged teal, bufflehead, greater yellowlegs, and killdeer all forage actively on vernal pool branchiopods during spring migrations (Yolo Natural Heritage Program 2009). Western spadefoot, bullfrog, and mosquitofish also forage on VPTS.

Mobile predators, such as waterfowl and shorebirds, can expel viable cysts in their excrement, thus aiding in the dispersal of VPTS. VPTS may also disperse in high water events which can temporarily interconnect adjacent pools.

Local Distribution

The 2005 USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* does not note any extant populations of VPTS in San Benito County. The CNDDB has no records of VPTS

occurring within the Project Footprint or the encompassing USGS quads. No critical habitat for VPTS has been designated in San Benito County.

No VPTS were observed in the Project Footprint or VFCL during the winter 2010 Protocol Vernal Pool Branchiopod Surveys. However, VPTS were observed in one pool on the VRCL during the winter 2010 Protocol Vernal Pool Branchiopod Surveys.

5.0 EFFECTS ANALYSIS AND DETERMINATIONS

Federally listed species that occur in the Project Footprint would be affected by activities associated with construction, operation, and maintenance of the Action. Potential direct and indirect impacts include temporary disturbance and displacement, loss and fragmentation of habitat, and mortality of individual plants and animals. Direct impacts are those that cause immediate responses such as mortality, habitat loss, and disturbance (resulting in behavioral changes e.g. flushing, displacement, etc.). Indirect impacts are those that cause a protracted response such as increased foraging time or increased roost tree searching due to habitat reduction and/or habitat degradation from noxious weed invasions or habitat fragmentation.

The solar arrays, roads, and supporting facilities are expected to have some adverse effects on federally protected T&E species. Continued use of the site for solar (PV) production would likely alter the micro-climate under the arrays due to shading, change vegetation compositions or directly exclude species occupancy. However, construction and operation of the solar facility has been designed to avoid and minimize impacts to existing resources to the maximum extent practicable, and on-going management of the grasslands that will remain on site are intended to be specifically managed to maximize food production for such species as GKR and other small burrowing animals. Therefore, while some degradation is expected, the site is expected to continue to provide suitable habitat attributes for some of these species to persist.

Many of the species addressed in this document exhibit life history strategies that would be best classified as R-selected species, with high reproductive capacity that more closely tracks changes in resource production than species with lower reproductive rates that usually exhibit longer lag time as functional and/or numerical response(s). In fact, populations of such species (GKR, BNLL, CTS, VPFS, CFS, LHFS, and VPTS) that occur within the Project vicinity are known to fluctuate substantially with rainfall patterns – wetter years tend to produce higher food resources, higher reproductive rates, and increasing populations. Poorer rainfall years, particularly several in a row can lead to depressed populations. R-selected species exhibit life history strategies that may allow them to occur in areas of high disturbance.

The Project may result in the incidental take of individuals of several federally listed species as a result of:

1. Solar array installation, grading, relocation of species, erection of fences, and other ground disturbing activities associated with construction, and vehicle traffic specific to construction.
2. Operations and maintenance.
3. Preservation and management of Conservation Lands.
4. Decommissioning.

The Action would also result in the preservation and management of approximately 24,185 acres of Conservation Land in perpetuity that would provide significant benefits to several listed species, including species that would experience take as a result of project implementation.

A thorough study of the federally listed species occurring within the project footprint was completed for the Project and vicinity. The *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998) and other relevant literature was reviewed, and the resource agencies and species experts were consulted regarding the federally listed species in the Action area and in the region.

The spatial scale for analyzing impacts to the federally listed species (and determining appropriate conservation measures to mitigate unavoidable impacts of the Project on such species) is the Action Area. The Action Area is situated within the Ciervo-Panoche Natural Area that provides a regional context for

impacts. Haight et al. (2004) described the Ciervo-Panoche area as a region that consists of approximately 214,000 acres (866 square kilometers [km^2]) and is made up of approximately 59,305 acres (240 km^2 or 28 percent) of protected public lands, and approximately 154,688 acres (626 km^2 or 72 percent) of unprotected private lands. This region is referenced in the Recovery Plan (USFWS 1998) and the USFWS 5-Year Review for the relevant species.

Within the Ciervo-Panoche Natural Area, the Panoche Creek Watershed encompasses approximately 33,000 acres. The rangeland valley floor of Panoche Valley encompasses approximately 14,000 acres. The developed Project would permanently disturb approximately 2,492 acres within the Project Footprint. Temporarily disturbed areas would be restored after construction is completed. Once restoration of temporarily disturbed areas is complete, the total interstitial space would be approximately 941 acres. Undisturbed areas would include on-site drainages, the 100-year floodplain, and biological avoidance areas included in the VFCL.

Construction of the Project will include solar panels that will be mounted above ground on steel posts driven into the ground, and areas under and around the solar arrays will continue to exist as grasslands. Unfortunately, little is known about how the federally listed species will react to the placement of a solar facility on the landscape. The elevated solar arrays, roads, and supporting facilities are expected to have some adverse effect on these species' continued use of the site, may alter the micro-climate under the arrays (shading), the vertical structures may alter species behavior, and undisturbed habitats will be fragmented. It is assumed that some unquantifiable amount of habitat value will remain within and under the solar arrays post-construction. However, given that such residual value of habitat within and under solar arrays cannot be calculated at this time based on current information, residual value of habitat was not given significant weight in the assessment of impacts.

The Action also includes the permanent conservation of approximately 24,185 acres adjacent to the Project Footprint in the form of three distinct conservation areas: the VFCL (approximately 2,523 acres), the VRCL (approximately 10,772 acres), and the SCRCL (approximately 10,890 acres). Together these conservation lands will permanently conserve suitable, occupied habitat for several listed species analyzed in this document. Portions of these conservation lands (e.g. Silver Creek Ranch) have been identified by the USFWS as highest priorities for conservation in order to achieve recovery for several species (e.g. GKR). Because the Conservation Lands are considered a part of the Action, the direct and indirect effects of the preservation of the 24,185 acres of conservation lands on the individual federally listed species are analyzed below.

Table 22 provides a summary of the species impacted by the Action, the number of individuals potentially impacted and conserved, and mitigation measures to be implemented for each species.

TABLE 22 INDIVIDUALS IMPACTED AND POPULATION ESTIMATES FOR SELECT T&E SPECIES ON CONSERVATION LANDS

Species	Estimated Number of Individuals				Acres of Habitat		Additional Mitigation
	Project Footprint	VFCL	VRCL	SCRCL	Acres Impacted	Acres on Conservation Lands	
CTS	94	150 (total for VFCL and VRCL)		Unknown. 2 ponds with unknown hydrology were located during reconnaissance surveys.	2,371 (no breeding ponds impacted)	4,028.1	Creation of CTS Breeding Ponds and Conservation Management Plan
GKR	197-506	311-568	Up to 2,137 individuals	Up to 44,871 individuals	2,492	16,576.3	GKR Relocation Plan Conservation Management Plan
SJKF	11**	12 individuals	10+ individuals	Unknown (≥Valadeao Ranch)	2,492	14,863	Conservation Management Plan
BNLL	0	145*	Unknown (suitable habitat present, none observed)	Unknown (suitable habitat present, BNLL observed)	2,492	11,833	Conservation Management Plan

*105 BNLL observations during the 2009/2010 surveys seasons and 40 observations of BNLL were recorded during the 2013 survey season. The estimated number of BNLL does not account for repeat observations of individuals during the BNLL surveys.

Number estimated in Project Footprint is not the estimated number to be impacted by the Project (Section 5.2**)